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COMMUNICATIONS

SIMPLE DETACHMENT OF THE RETINA

With a report on 75 cases treated at Moorfields Eye Hospital by Gonin's Method

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Introductory

PROFESSOR GONIN began to publish his opinions on the pathology of simple detachment of the retina more than twenty-five years ago, and for the past eight years has been successfully operating on a high proportion of his cases, but not until recently did his method attract world-wide attention. In a paper read before the *Soc. franç. d'Ophtal.*, in 1928, he said: "Après avoir eu longtemps l'impression de prêcher dans le désert, j'ai la satisfaction d'avoir aujourd'hui rallié à ma conviction plus de mes confrères de Suisse et de l'étranger." A glance at the history of the surgical treatment for detached retina, recently reviewed by Stallard, will readily explain why Gonin for a long time encountered scepticism and indifference. Iridectomy, choroidodialysis, retinal suture, sclerectomy with or without attempts at permanent drainage by means of horse-hair or gold wire; injection of various chemical substances under the conjunctiva, into the inter-retinal space, or into the vitreous—these and numerous other methods had been

given a trial. The best that can be said about many of them is that they may have afforded the patient some relief from the monotony of prolonged decubitus. If the advocate of any particular operation could occasionally report a cure following his treatment, he had to be reminded that the literature already contained many examples of retinal detachment ending in spontaneous cure. But in the last few years two main causes have combined to establish the reputation of Gonin's method; first, Gonin himself has, over a reasonably long series of cases, achieved far better results than were obtained with any of the older methods; secondly, ophthalmic surgeons in several different countries have reported a large number of successes from the use of his operation.

Definition

Simple detachment of the retina means partial or complete separation of the layer of rods and cones from the retinal pigment-cell layer, arising either spontaneously or as the apparent result of some minor trauma to the globe from direct or indirect violence. Indirect violence may result from a fall, a violent fit of coughing, or, as in the case mentioned by Vogt, a jolt occasioned by the sudden starting of a railway train. Gonin's conception of its pathology is not intended to serve as an explanation for the detachments associated with violent trauma, intra-ocular foreign bodies or parasites, neoplasms or profuse exudations of the choroid. On the contrary, he has repeatedly admitted that different mechanisms are operative in the production of the various kinds of retinal detachment.

Gonin's Views

Gonin believes that simple detachment is produced by the passage of fluid from the vitreous into the inter-retinal space through one or more holes in the neural layers of the retina, and that the closure of these holes is essential for cure. He explains the origin of a hole in the following way:—Isolated or multiple foci of anterior choroiditis are a common finding on examination of the extreme periphery of the fundus. These foci, whether they be the result of myopia, senility, syphilis, sepsis, or of some unknown factor, cause degenerative changes in the vitreous body. The heavier portion or pulp of the vitreous becomes contracted forwards, while the rest of the vitreous chamber is filled with the remainder or more fluid portion. Moreover, the foci of anterior choroiditis promote localized adhesions of the vitreous pulp to the retina through the medium of epithelial cells shed from the ciliary body. When adhesions form below, they are often firm and

diffuse, because the pulp tends to sink downwards. Superior adhesions, on the other hand, affect smaller areas, so that the whole mass of the vitreous pulp may come to hang precariously from a small area of the upper retinal surface. Lister has already employed the analogy of a glass vessel containing fluid or semi-fluid substance. If such a vessel is rotated, the movement of the contents lags behind the movement of the vessel itself. Hence it is easy to imagine the result of a sudden, swinging movement on the part of an eyeball, the heavier portion of whose vitreous is suspended from the delicate retina. A slight tweak may merely produce photopsiae, but a smart tug may tear the retina. When once the retina is torn vitreous fluid passes into the inter-retinal space, but can rapidly undergo absorption if the rent is closed. The inter-retinal fluid in these cases has the same composition as the fluid portion of the vitreous, and shows by its behaviour under the influence of various fixative reagents that it differs greatly from the inter-retinal fluid found in exudative cases. Myopic eyes are predisposed to simple detachment, but the mechanism is not essentially different from that of simple detachment occurring in non-myopic eyes.

The importance of holes in the production and maintenance of simple detachment of the retina was recognized by Leber, Nordenson, and others before Gonin. In 1924, Lister admitted that, in his experience, no case of detachment associated with a visible hole in the retina had ever been improved, whether with or without treatment. Ignipuncture was in use before the beginning of this century, but Gonin's great achievement consisted in devising a method of applying ignipuncture to the hole itself, with a view to sealing it.

Diagnosis

The differential diagnosis between simple and other varieties of detachment is adequately described in the standard text-books, and need not be detailed here. Whenever the diagnosis of simple detachment is made, the condition of both eyes is investigated. The vision, visual fields, state of the iris and of the media must be noted, and observations made upon the shape, size and situation of the detachment, as well as upon any landmarks in its neighbourhood, *e.g.*, pigment accumulations or retinal haemorrhages. Both fundi should be explored up to the extreme visible limit of the periphery with the aid of mydriasis. Then follows a careful search for one or more holes in the retina of the affected eye. If the case is considered suitable for operation, an attempt is made by means of ignipuncture to close the holes after their position has been calculated.

The Significance and Morphology of Retinal Holes

Holes in the retina may be difficult to detect, especially in long-standing cases. Meller's observation that they are found in a larger proportion of recent than in old cases may be taken as evidence against the view of Deutschmann and Sourdille, who say that holes are the results, not the causes of simple detachment. If, even in the absence of any considerable opacity of the media, it should be impossible to detect a hole at the first examination, there is no reason to assume that a hole is lacking. It may be hidden behind a fold of detached retina. A further search may reveal it, especially if in the meantime the patient has lain at rest for a day or two. In any case, repeated and painstaking examinations ought to be made until the hole is found, as it nearly always is found by those who have persevered with the method. The periphery of the retina, between the equator and the ora serrata, is the favourite situation for a hole, and, of the four quadrants of the globe, the supero-temporal is the one most commonly involved. The proximity of a hole is often betrayed by a focus of old choroiditis in the neighbourhood. It need not necessarily be situated in that portion of the retina which is detached at the time of the examination. A detachment that begins above may sink down, so that the hole, representing the position of the original detachment, is now seen on the flat portion of the retina. Hamilton has pointed out that a detailed account of the initial symptoms will sometimes indicate the original position of the detachment, and incidentally of the hole, provided that those symptoms included the appreciation by the patient of a black spot in a definite direction. Vogt finds that examination by means of red-free light is useful for accentuating the edges of a hole against the background of the choroid. In Gonin's experience the length or diameter of a hole may range from 0·3 mm. to 18·0 mm.

The following types of hole are recognized:

1. Arrow-head shaped, in which the base of the arrow forms the attached end of a tag of retina, and is peripheral to the point of the arrow.
2. Horse-shoe shaped.
3. Rounded, punched-out holes, suggesting the possibility of a pre-existing cystic degeneration of the affected portion of the retina.
4. Festoon-shaped, situated at the extreme periphery, and corresponding to a peripheral disinsertion of the retina. This type differs from the rest in being commoner below than above, and is often associated with direct trauma. It tends to increase in size.
5. Holes with irregular outlines.

Prognosis

It is impossible to lay down rigid rules as to which are the cases suitable for operation. Certainly the demands upon the endurance and co-operation of the patient are greater in this than in any of the other ophthalmic operations that are performed under local anaesthesia. Therefore the difficulties are increased in the very young, the very old, or in neurasthenic patients. Prognosis is best in cases where the detachment is of only a few weeks' duration. Gonin claims success in 70 per cent. of a series of over 30 cases seen within three weeks of the onset of detachment. Cases of one to three months' duration show a 50 per cent. proportion of success. After three months the chances of benefit from operation fall still lower. Other favourable factors in prognosis are singleness and small size of the hole, absence of gross vitreous opacities or of extensive uveal disease. Nevertheless, good results have sometimes been unexpectedly obtained in longstanding cases showing large or multiple holes which necessitated several separate cautery operations. It is, therefore, worth while to make an attempt to cure cases that hold out only a slender hope of success. The fact that a useful degree of functional restoration is possible in some cases after several months of detachment is curious. It proves that the inter-retinal fluid provides a good substitute for the nourishment that is normally supplied by fluid transuded from the choroidal capillaries, although Weekers' investigations in rabbits' retinae revealed definite histological changes in the rods and cones as early as two weeks after the onset of detachment.

Topography

Calculation of the position of the holes before operation requires examination of the fundus under full mydriasis. It is necessary to know (*a*) the distance of a hole from the ora serrata, and (*b*) the meridian passing through the middle of the hole. In this country the direct method of ophthalmoscopic examination is generally favoured, but Gonin and many other continental surgeons prefer the indirect method. Lindner uses a special Gullstrand apparatus for localizing the hole. Amsler and Dubois have proposed several topographical modifications and elaborations. Vogt chooses to estimate the distance of a hole from the macula rather than from the ora serrata. The ora serrata is assumed to be visible to ophthalmoscopic examination when, with the pupil fully dilated, the eyeball is rotated as far as possible in the required direction. In an eye of average size it lies at a distance of 8 mm. from the limbus. The diameter of the optic disc is 1·5 mm., and 1 D.D. (disc-diameter) is the conventional unit of measurement in fundus topography. The soldering action of the cautery extends,

especially in recent cases, beyond the area to which it is immediately applied, so that a favourable result is not inevitably prevented by failure to hit upon the middle of the hole. In peripheral disinsertion it is actually better to apply the cautery rather to the central side of the gap. In nearly all cases it is advisable to aim 0·5 to 1·0 mm. to the central side of the estimated position.

In the practice of individual surgeons the operative technique recommended by Gonin has been subjected to various alterations in detail. Different answers have been given to the questions: What is the best form of cautery? To what depth should it penetrate? For how many seconds should its application be maintained? The technique in use at Moorfields will be presently described, and an account given of the results so far obtained there. It is not proposed to offer a detailed analysis of the results so far reported abroad. Until further evidence has accumulated, and become standardized in interpretation, no valid statistical comparison can be made. The significance of a group of results cannot be assessed without a knowledge of several important features, *e.g.*, the ratio of easy to difficult cases, the extent of the patients' co-operation on the operating-table and in after-treatment. It is at present sufficient to mention that successful results have been recorded by many foreign ophthalmologists including Vogt, Arruga, Lindner, Meller, Perez-Bufill, Rubbrecht, Schoenberg, Wiener, Bruckner*, Weill*, and Igersheimer*. Dubois has recently urged that Gonin's operation is suitable not only for simple detachment, but also for a few selected cases of detachment occasioned by a perforating injury unattended by gross destruction of the globe.

The Operation as performed at Moorfields

On the eve of operation two marks are tattooed with Indian ink at diametrically opposite points of the limbus in line with the estimated position of the hole.

The eye having been cocainised, about 0·5 c.c. of a mixture of equal volumes of 4 per cent. novocaine and 1/5000 adrenalin solutions are injected beneath the ocular conjunctiva at the site determined for cautery puncture. After an interval of five minutes a knotted guiding thread is passed through the episcleral tissue at the limbal pigment mark remote from the side of the retinal hole. The ocular conjunctiva is now divided at a point about 0·5 cm. from the pigment mark on the side adjacent to the retinal hole, and is incised for a length of about 1·5 cm. so that the incision is parallel to the tangent to the arc of the limbus at the pigment mark. Tenon's capsule is opened and the sclera bared over the required situation. The guiding thread is passed through a hole punched in the centre of the blade of a

Desmarres' retractor which is placed in the conjunctival wound and retracted, thus giving access to a wide area of sclera. The guiding thread is now arranged so that it passes from the first tattoo mark across the centre of the cornea over the second pigment spot, so that its prolongation crosses the site of the retinal hole. The pre-determined distance of the retinal hole from the limbus is marked on the exposed sclera with a pair of callipers, one point of which has previously been dipped in sterilized Indian ink. Two or more conjunctival sutures are inserted in the cut ends of the ocular conjunctiva, and the guiding thread withdrawn. An electric cautery at white heat now sears a way through the sclera at the point determined, and, as soon as the subretinal fluid has escaped, it is again heated up to white heat and plunged through the opening in the sclera so made, and immediately withdrawn, the average depth of penetration being 1 cm., and duration two seconds. The conjunctival sutures are immediately tied off, the speculum removed, and double bandages applied.

After Treatment

The patient is nursed with the head placed so that the situation of the hole is the most dependent part of the eye. Thus, if the rent was at 6 o'clock, an upright posture is adopted; if it was at 12 o'clock the end of the bed is raised on 18-inch blocks and no pillows are allowed. The patient is warned of the necessity for absolute rest. On the fourth day after operation the bandages are removed, the lids cleaned, and a drop of 2 per cent. atropine instilled into the affected eye, after which both eyes are again bandaged.

On the eighth day a further drop of 2 per cent. atropine is put in the operated eye, the conjunctival sutures are removed, and the fundus examined. If the detachment is as extensive as before operation and there is no sign of improvement, bandages are not re-applied, and the patient is allowed up. If, on the other hand, the detachment is less extensive, or if the retina is in place, then both eyes are again bandaged and absolute rest secured for a further three days, after which the affected eye is again atropinised and its fundus examined. Whatever the condition of the retina, a start is now made with getting the patient up, and both eyes are uncovered.

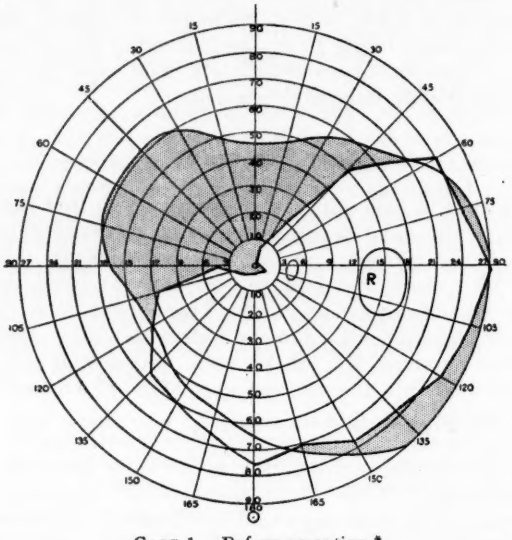
A fortnight after the cautery puncture the operated eye is thoroughly examined in a dark room, and special note made of the site and size of the cautery scar, its relation to the retinal rent, the extent of retinal detachment (if any), and the state of the vitreous. If the retinal hole has been sealed and the detachment is back, the field of this eye is charted, and the patient discharged. In the

majority of cases, however, one cautery puncture fails to effect a cure, owing to faulty localization or to the retinal tear being too extensive to seal with one cautery puncture, in which case one or more additional operations have to be undertaken.

Four illustrative cases will now be described.

Illustrative Cases—Results at Moorfields

Case I.—A. F., a man aged 26 years, admitted on April 5, 1930, gave a history of the right vision becoming suddenly blurred four months previously. There was no history of injury, but he had



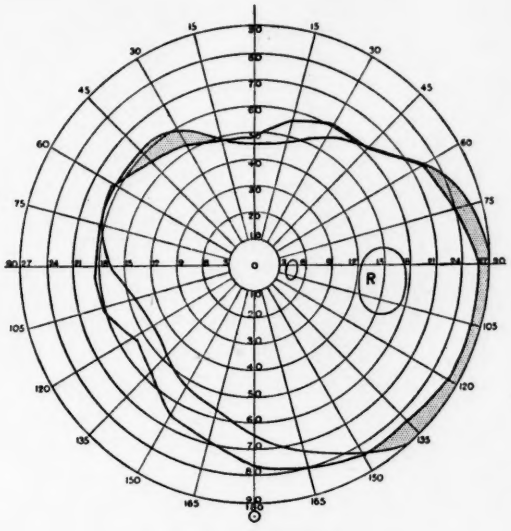
CASE 1. Before operation.*

always been short-sighted. The right eye had a fairly extensive detachment infero-temporally with a retinal disinsertion extending from "6 to 7 o'clock." The macula was involved in the detachment and visual acuity was reduced to finger-counting at two feet. The visual field showed a large defect supero-nasally. The left eye was normal and its vision with correction – 1·25 D. sph. – 0·5 D. cyl. 70° was 6/5.

On April 7, 1930, cautery puncture was performed upon the right eye at " 6.30 o'clock," 9·5 mm. from the limbus.

* In all cases the 1° moving white object of a Lister perimeter was used.

On April 16, 1930, the right eye was examined. The cautery scar was beautifully placed in the centre of the dis-insertion, the rim of which could be seen round the periphery of the scar. The detachment was back, the visual field full and central vision with correction - 0·75 D. sph. - 1·25 D. cyl. 90° 6/24.



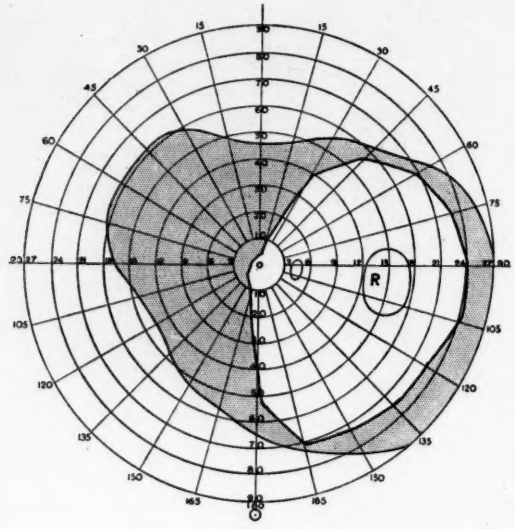
CASE 1. After operation.

Case II.—A. P., a woman aged 30 years, was admitted on June 14, 1930, with a history of sudden failure of vision in the right eye three weeks previously. There was no history of trauma, but she was myopic and had worn glasses for 15 years.

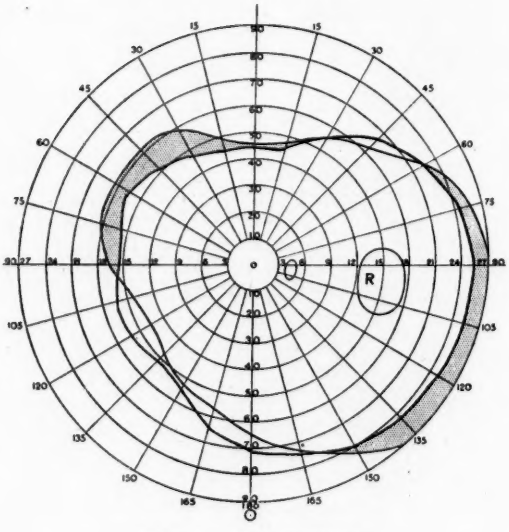
The right eye had an extensive detachment down and out with a round hole at "7 o'clock," about 1 disc diameter from the ora serrata. There were patches of old choroiditis scattered round the fundus periphery. The visual field was much constricted nasally, and the visual acuity was reduced to fingers at two feet. The left eye was normal and its vision with correction - 8·5 D. sph. 6/6 partly.

On June 20, 1930, a cautery puncture was performed upon the right eye at "7 o'clock," 10 mm. from the limbus.

On July 3, 1930, the detachment was back, the retinal hole sealed, and the field full. Visual acuity with correction - 3·5 D. sph. - 2·5 D. cyl. 180° had improved to 6/36.



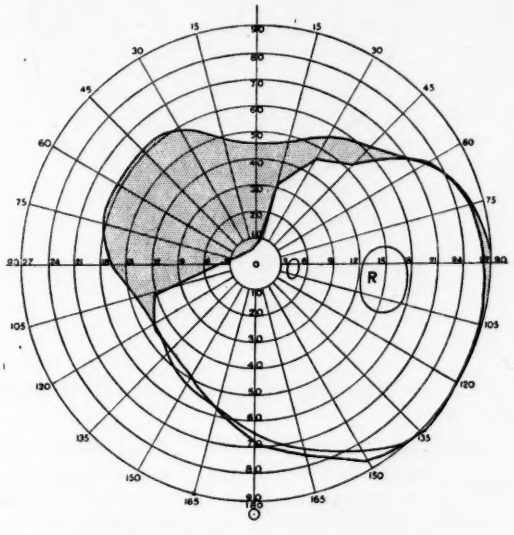
CASE 2. Before operation.



CASE 2. After operation.

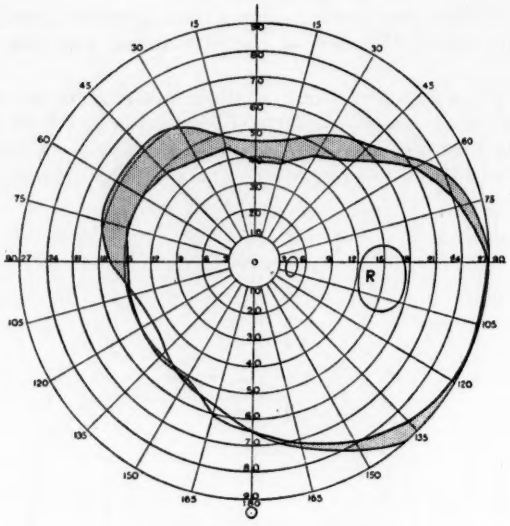
Case III.—L. S., a boy aged 15 years, was admitted on November 11, 1930. He gave a history of normal vision in both eyes until three months previously, when a mist appeared over the right eye. There was no history of recent trauma, and the boy was emmetropic.

In the right eye there was a shallow detachment of the retina inferiorly with a horse-shoe-shaped disinsertion at "6.30 o'clock." The macula was just involved in the detachment. Visual acuity of this eye was 3/36, not improved, and the field showed an exten-



CASE 3. Before operation.

sive defect supero-nasally. The left eye was normal and its vision was 6/5. On November 12, 1930, cautery puncture was performed upon the right eye at "6.30 o'clock," 9·5 mm. from the limbus. On November 28, 1930, there was still a small, shallow peripheral detachment down and out. The cautery scar was well placed in the disinsertion, but there was a very small portion of the latter still visible to the nasal side of the scar. The visual field was full, and central vision $\bar{c}$ + 2·5 D. sph. 6/36. Further operative measures were considered unnecessary, and the patient was discharged on the following day. A month later, when examined in the out-patient department, the retina was found to be completely in place.



CASE 3. After operation.

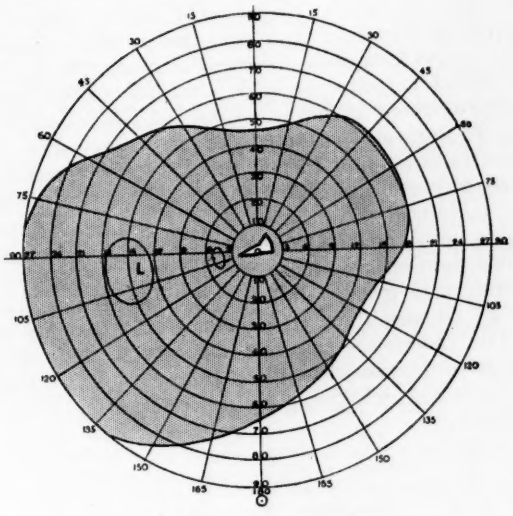
Case IV.—A case showing remarkable improvement in field and central vision is:—

J. M., a man aged 62 years, who had noticed a black spot in front of the left eye two months previously. For the last three weeks the vision of this eye had become generally blurred. There was no history of local or general trauma, but the patient was a myope.

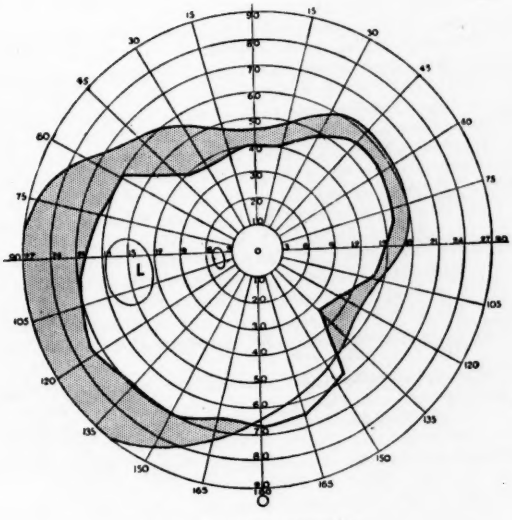
The right eye had a normal myopic fundus and its visual acuity with correction - 3·5 D. sph. - 3·0 D. cyl. 110° = 6/9. In the left eye there was a shallow but practically total detachment of the retina with a horse-shoe-shaped rent at "10 o'clock," about 2 disc diameters from the ora. Visual acuity was reduced to fingers at 1 metre, and the field was down to the fixation point.

On September 6, 1930, cautery puncture was performed at " 10 o'clock," 15 mm. from the limbus, but this scar overshot the hole by about a disc diameter. A second cautery puncture on September 17 sealed the upper limb of the rent, and a third on October 1 effectually blocked the lower limb.

On October 14, the detachment was back and the hole totally sealed. Central vision with - 3·5 D. sph. - 3·5 D. cyl. 70° had improved to 6/12 partly, and the visual field was nearly full.



CASE 4. Before operation.



CASE 4. After operation.

Results at Moorfields

During the year 1930, 75 cases of retinal detachment were submitted to the operation of cautery puncture by Gonin's method at Moorfields Eye Hospital. Of these 75 cases, 24 were discharged with the retinal detachment back, and the visual field full; 12 showed improvement either in visual field or visual acuity; the remaining 39 were either unchanged or made worse. To obtain 32 per cent. of cures and 16 per cent. of improvements in such a serious and hitherto almost hopeless condition as detachment of the retina is indeed striking, especially as the method was an entirely new one, and but little attempt had been made to select cases during the first six months of the year.

The authors are greatly indebted to the Moorfields surgeons, who have all allowed them free access to the patients under their charge. The individual case-records refer to patients under the care of Sir John Parsons, Mr. F. A. Juler, Mr. R. A. Greeves, and Mr. C. B. Goulden, who have kindly consented to the publication of these details.

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DIFFUSE NEUROFIBROMATOSIS WITH PROPTOSIS

BY

R. FOSTER MOORE

LONDON

DIFFUSE neurofibromatosis in which the eyelids, orbit and surrounding parts are involved, is a well-recognized picture, and a good many examples of it have been fully reported in this country. At different times I have had four cases under my care and the last one being a good example with, as is usual, several points of interest, it seems worth while to report it in detail, and at the same time to refer, with regard to particular points, to the other three cases.

Clinical Details

H. M., aged 33 years, male, was sent to me at St. Bartholomew's Hospital by Dr. A. C. Roxburgh to see if it were possible to improve his condition. I admitted him to my ward on June 18, 1930. The patient's tale was that his right eye was quite normal until the age of six months when he fell downstairs, and following this accident the eye gradually became pushed forward. At the age of seven he attended the Royal Victoria Eye and Ear Hospital, Dublin, and Dr. Werner has been good enough to look up the notes of that date, and has sent me the following particulars:—He was seen in December, 1903, with the history that the right eye had been protruding for three months. At this time there was slight proptosis which was increased by muscular exertion, after which marked pulsation of the globe was felt and a faint bruit was heard over the malar bone. Later the condition got markedly worse, the eye being pushed downwards and forwards. No tumour was felt and there was no engorgement of the retinal veins of this side. The interior of the orbit was exposed from the outer side by partial resection of the outer wall and a few weeks later the carotid artery was tied, as a result of which the proptosis is stated to have been much less and no pulsation was felt on leaving the hospital. He has been to a number of hospitals since then but does not think the eye has changed; he thinks it protrudes more than ever when he is excited and can then feel it throbbing and pulsating. Apparently the chief disadvantage from which he suffers is his inability to obtain work. He states that the first of the nerve tumours of the skin to appear was the one in the left hypochondrium (Fig. 1) and that they have gradually increased in number since. There has been no pain in any of the lumps and indeed they cause him no inconvenience.

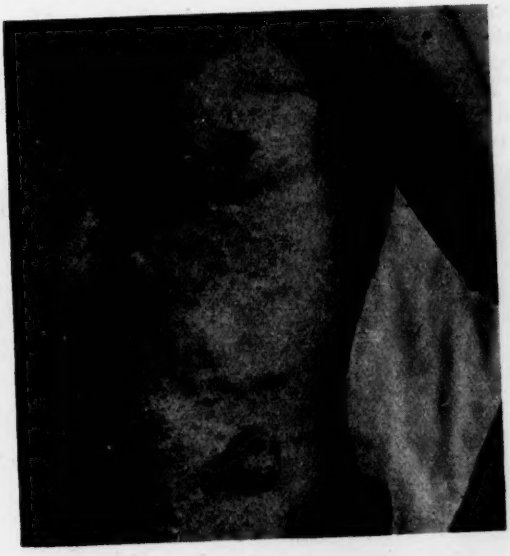


FIG. 1.

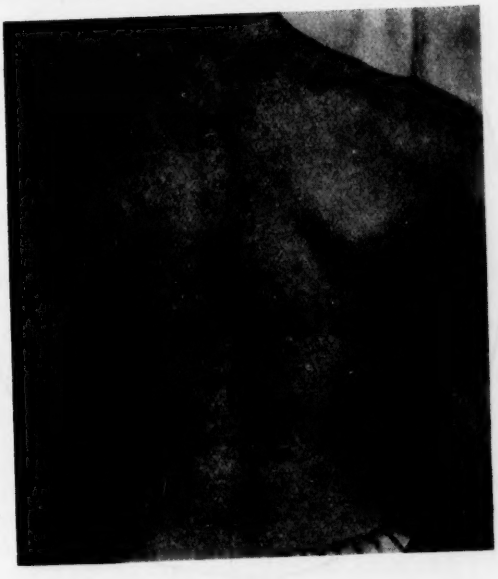


FIG 2.

He has occasional frontal or occipital headaches. He is not aware of any defect of sight, and in spite of the great displacement of the eye has never had diplopia or any other visual disturbance.

Alexis Thomson has pointed out that neurofibromatosis is not infrequently familial and hereditary, but this patient's father and mother, two brothers and two sisters are alive and well, and without any similar condition of the eyes, nor, so far as he knows, of the skin. The distribution, number and arrangement of the nodules is well seen in the accompanying photographs (Figs. 1 and 2). The largest one is on the abdomen and is two inches in diameter. Many of them are only a few millimetres across. The great majority are intra-dermal, those which are subcutaneous are movable in one plane only, suggesting that they are attached to a longitudinally-running structure.

The Skull

Measurements: circumference 61 cms. (average male 52·5), length 20 cms., breadth 16·4 cms. Cephalic index, breadth $\times \frac{100}{\text{length}} = 82$, that is, he is brachycephalic (Fig. 3).

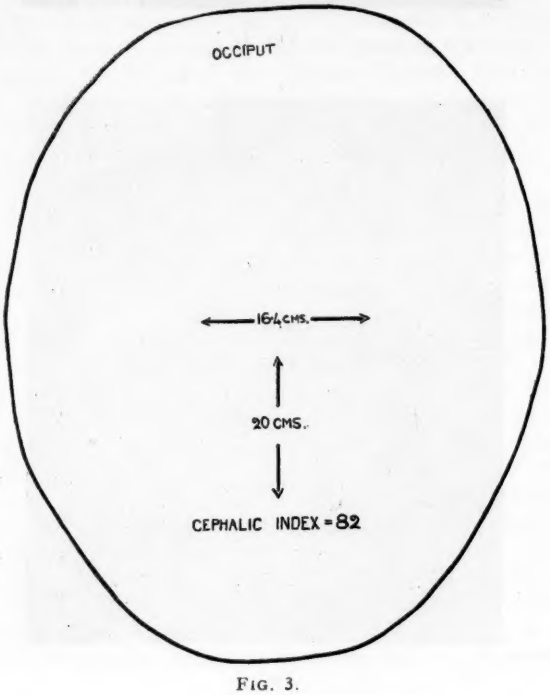


FIG. 3.

X-ray Examination

The right orbital cavity is considerably larger than the left and no details of the posterior orbital walls are seen (Fig. 4) apparently

FIG. 4.

as a result of malformation or deficiency, providing therefore a free connection between the orbital and cranial cavity.

The Eyes

Marked forward and downward displacement of the right eye is well seen in the photograph (Fig. 5). It is possible to get one's fingers so far behind the globe as to feel the optic nerve. The lids close well over the eye during sleep, and the movements are but little restricted. On placing the flat of the hand upon the closed lids pulsation is felt; it is not, however, of the expansile type as occurs in aneurysm, nor is the proptosis appreciably reduced by pressure. The fundus is normal, the visual acuity is 6/9 and the field of vision is complete. (Figs. 6 and 7). The left visual acuity is 6/9 also, the visual field too is full and the fundus is healthy. Adjoining the upper edge of the disc in this eye is a patch of medullated nerve fibres. No abnormality was found in the urine, the blood sugar of the capillary blood an hour and a half after a meal was 106 mgs. per 100 c.c.

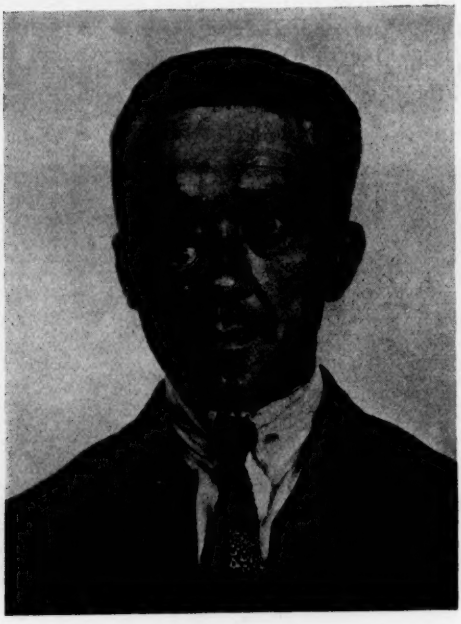


FIG. 5.

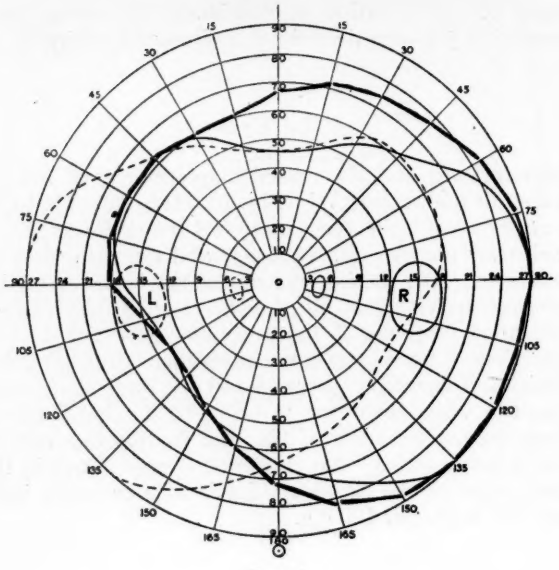


FIG. 6.

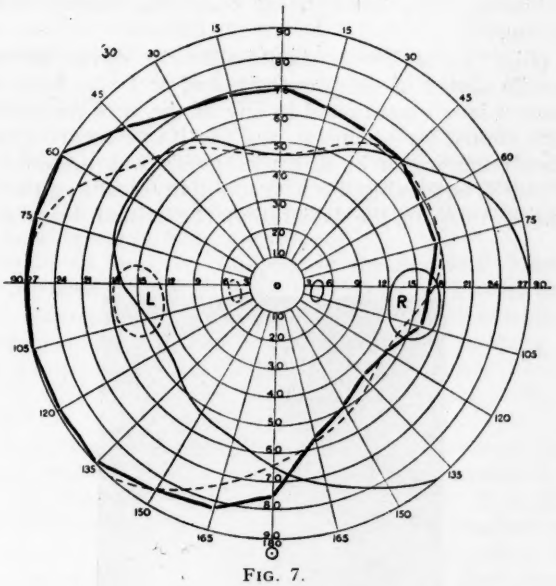


FIG. 7.

The earliest account of collected cases of tumours of nerves was by William Wood (" Observations on Neuroma," *Edin. Med. Chir. Trans.*, Vol. III, 1829) and it is worthy of note that he believed they arose from the connective tissue sheaths of nerves. He quotes a case from Cheselden's " Anatomy of the Human Body," in which the tumour was removed.

A number of other cases were then reported until R. W. Smith's classical work appeared in 1849 (" A Treatise on the Pathology, Diagnosis and Treatment of Neuroma," Dublin, 1849) and of recent date Alexis Thomson's outstanding monograph " On Neuroma and Neurofibromatosis, Edinburgh, 1900 " should be consulted for information on every branch of the subject.

There are several points which are exemplified in these cases to which I should like to draw attention.

The history does not always commence at birth although the condition is probably present then, the skin tumours not infrequently, as in the present case, increase in number at about puberty.

Thomson has shown that many cases of diffuse neurofibromatosis are associated with other tumours of nerves such as plexiform neuroma which is of a precisely similar nature except that it is limited to one nerve or nerve trunk, intracranial tumours, tumours

of the chiasma, etc., but none of these was exemplified in the present case.

The point to which I should like to direct attention is the pulsatile nature of the proptosis, and so far as I can see this phenomenon is not mentioned in any of the very numerous cases which are quoted by Thomson, and yet it has occurred in all the four cases I have seen in which proptosis was present. In the present case it had induced a surgeon many years ago to ligature the carotid artery in the belief that the orbital mass was of a

FIG. 8.

vascular nature. Fig. 8 is a picture of a case which Mr. Holmes Spicer has been good enough to send me in which also the exophthalmos was pulsatile.

The pulsation is not of the expansile type that is so characteristic of aneurysm, nor is there the bruit to be heard over the skull.

It will be seen in the skiagram (Fig. 4), that the orbit is much larger than on the opposite side and no bony details are to be seen in the posterior orbital wall. It seems evident, therefore, that the pulsation that is felt is not of direct vascular origin but is transmitted directly to the orbital tissues from the brain.

Rockliffe and Parsons published a case in which the patient, a child of two, died after exenteration of the orbit preceded by ligature of the carotid artery (*Trans. Path. Soc.*, 1903). In their case the whole of the bone of the orbit except the floor and outer wall had disappeared, or I suspect had never developed, so that the growth was in direct continuity with the cranial cavity, a fact which no doubt was responsible for the pulsation.

A second feature which was but slightly marked in the present case but was very marked in one of my other cases is a large brachycephalic skull and especially a fullness or bulging in the temporal fossa. (Ludford Cooper, *Trans. Ophthal. Soc. U.K.*, 1906, XXVI, 136).

In one of my cases this was so marked as to appear as if the squamous bone in particular were being pushed outwards by some tumour within, and in another case although the prominence was less extreme the man had been trephined over the area, perhaps with the expectation of finding a tumour.

In addition to the bony bulging in the temporal fossa, it is common in those cases with large pendulous upper lids due to a plexiform neuroma to find that this condition has extended into the temporal fossa causing a doughy sort of swelling there. (Treacher Collins and Rayner Batten, *Trans. Ophthal. Soc. U.K.*, 1905, XXV, 248, and Snell, *Trans. Ophthal. Soc. U.K.*, 1903, XXIII, 157).

With regard to the skin tumours, if the present patient's observation may be trusted, they first showed themselves about 15 years ago, that is at the age of 18 years, about 12 or 15 years after the development of the proptosis. The presence of the opaque nerve fibres in the left retina may be no more than a fortuitous occurrence; on the other hand it seems likely that they are in some way connected with the abnormality of the other nerves of the body.

I have especially to thank my House Surgeon, Mr. E. G. Recordon, for the details of the clinical history and the general overhaul of the patient, and for obtaining the plaster cast and measurements of the skull.

ANGIOID STREAKS, AND THEIR RELATION TO A FORM OF CENTRAL CHOROIDAL DISEASE

BY

RAYNER D. BATTEN

LONDON

THIS selection of drawings from Hamblin's collection, together with the family which I report, while of interest in itself, is, I consider, important in the evidence it affords in confirming and consolidating the observations of others on angioid streaks and their relation to a special form of choroidal disease, and in establishing it as a definite disease, with special characteristics of its own, frequently familial in causation.

CASE 1. (Drawings 1 and 2). Seen in May, 1928.

Mrs. M., aged 52 years, sister to the two following cases.

Ten years ago, her sight failed suddenly in both eyes, for near and distance, and has remained the same ever since—she had only noticed a slight mistiness for distance vision previously.

No head-aches; no eye-aches. General health very good. No general medical history obtained.

Married 21 years; does all her own work; goes about alone; sews and writes, but cannot read. When the eyes were first affected, she attended Moorfields, but does not recollect under whose care.

V. Right 2/60. Left < 1/60.

Ps. = react. T.n.

Her visual fields are full, but she is unable to fix a central spot.

Right fundus shows widespread white choroidal atrophy or thinning all round O. D. On both temporal and nasal sides, there are islands of red choroid.

The chief disturbance is at the macula, where there is a dark mass of pigment similar to the " black spot macula " found in myopes, and presumably due to the same cause, viz. a macular haemorrhage.

There are also scattered patches of pigment, some superficial retinal, and some deeper pigmentation of a brownish red colour. There are no actual angioid streaks, but the deeper pigmentation is of much the same colour.

The left fundus resembles the right closely, but there is no black spot at the macula. Beyond the macula, there is a dense white crescent-shaped mass, superficial to the retina, ending in the feathery tails of retinitis proliferans. The scattered pigmentation is of the same character as in the right eye, both superficial and deep pigmentation. No angioid streaks were detected. I would suggest that there may have been angioid streaks, which have become absorbed, and are represented by the more diffuse pigmentation.

CASE 2. (Drawings 3 and 4)

C. N., aged 42 years, a brother of the first case, 10 years younger. I got him to come and see me in May, 1928. His sight had begun to fail three years previously, when he appears to have had a scotoma gradually encroaching on his central vision in the right eye. It appeared as if something was " chipped out " of the thing he looked at on the right hand side, and it gradually extended, covering half the eye.

In January, 1927, he was seen by Mr. Gayer Morgan, who showed the case at the Ophthalmic Section of The Royal Society of Medicine. I have been unable to obtain his full medical history. He is a spare healthy-looking man, with no family resemblance to his brother. He reports himself quite strong till 16 years ago, never quite strong since. He is said to have V.D.H. His W.R. is negative.

His right fundus shows marked angioid streaks, chiefly to the nasal side of the O.D.running vertically on the temporal side of the O.D. between the macula and the O.D. There is a patch of choroidal exudate in conjunction with an angioid streak, though not interrupting its course. The patch is nearer the macula than shown in the drawing and more triangular in shape.

In the left eye, the angioid streaks are more marked and on the nasal side of the optic disc. There is a small patch of choroidal exudate with pigmented margin directly in the course of an angioid streak, which it interrupts but does not divert. There are no definite haemorrhages.

His visual fields show a nearly full field in his right eye, except for slight constriction to the temporal side above, with a large central scotoma.

His left field is more constricted to the temporal side and above.

V. Right : < 6/60. Left : 6/6.

Mr. Morgan[6], when showing this case before the Section in 1927, reported as follows :—

Patient, a male; aged 39 years.

First seen, August, 1925, when he complained that straight lines were slightly dented when seen by the right eye. V. 6/6 in each eye.

Both fundi showed marked angioid streaks, peripheral patches of old choroidal scarring, faint pigmentary changes at both maculae, but no haemorrhage or exudate.

DRAWING 1.

DRAWING 2.

NOTE ON CASE 1—Drawings 1 and 2.

The changes here are typical of an advanced stage of this disease, and should be compared with those shown in 5 and 6 (her brother), also with 9, 10, 11, 12 and 13.
Changes of a similar character are found in other published drawings, notably those of de Schweinitz, Doyne, and others.
Note the pigmentation in scattered masses, the central choroidal thinning, disturbance, and the retinitis proliferans. But there are no angioid streaks.

DRAWING 3.

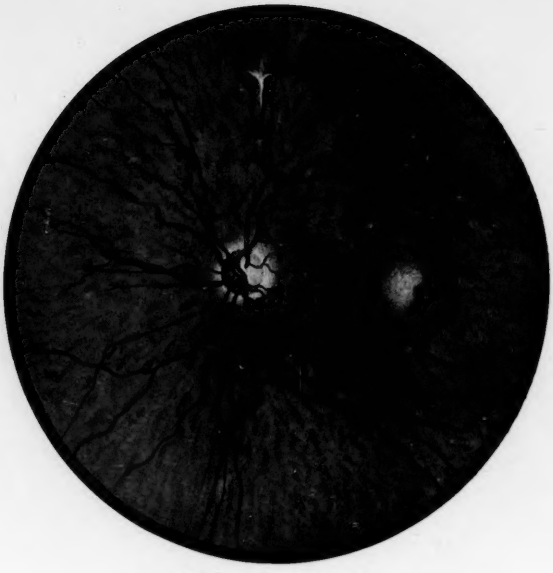
DRAWING 4.

NOTE ON CASE 2.

Drawings 3 and 4 are from the brother of Case 1. Show typical angioid streaks in both eyes. Note the choroidal spot in No. 4, interrupting the course of the angioid streak, and compare with Drawings 6, 13, and 14.

DRAWING 5, CASE 3, 1928.

DRAWING 6, CASE 3, 1929.



DRAWING 7, CASE 3.

NOTE ON CASE 3—Drawings 5 and 6 (right eye), 7 (left eye).

Drawings 5 and 6 show the stages of the formation of the central choroidal disease, with small patches of retinitis circinata. Compare Drawing 11. Drawing 7.—Note the macular pigmentation and disturbance. Drawing 5 was made in May, 1928. Drawings 6 and 7 were made in March, 1929.

DRAWING 8, CASE 4.

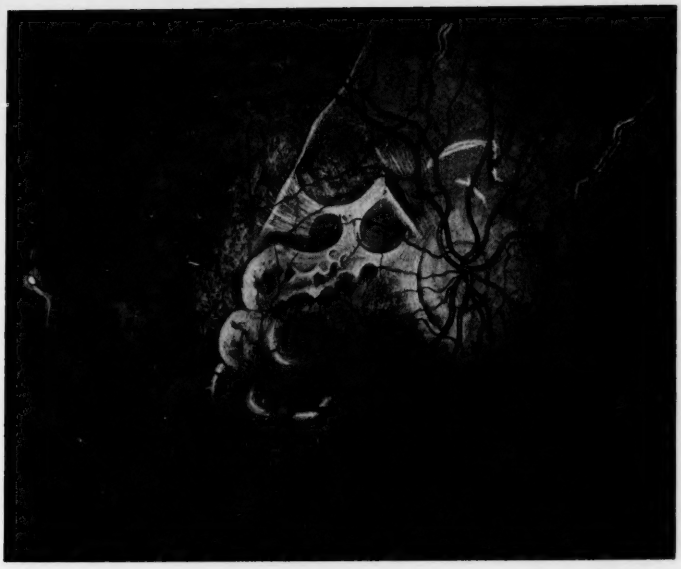
NOTE ON CASE 4.

The drawings in colour of the left eye. No. 1 was drawn in February, 1924. No. 2 was drawn August, 1930. No. 1 shows typical angioid streaks and central pigment changes, with a small haemorrhage just below the macula. No. 2 shows typical central choroidal changes and gross pigmentation. Drawing No. 8, right eye of the same patient, shows typical pigment changes and angioid streaks. The drawing was made in 1930 and shows but little change from the previous drawing in 1924.

CASE 4.

DRAWING 1, FEBRUARY, 1924.

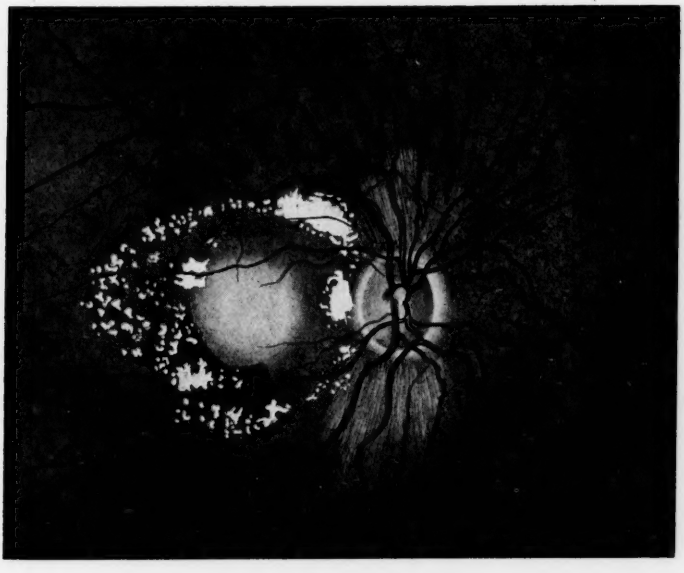
DRAWING 2, AUGUST, 1930.



DRAWING 9.

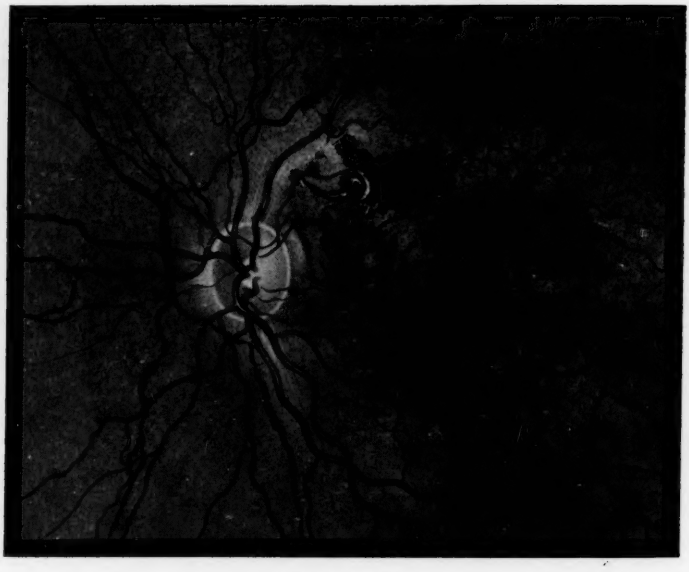
NOTE ON CASE 5.

Drawing No. 9.—Right eye shows typical central choroidal changes, scattered haemorrhages, and angioid streaks. The dark spots are haemorrhages, not pigmentation. The left eye was similar.



DRAWING 10, CASE 6.

DRAWING 11.



DRAWING 12.

NOTE ON CASE 6—Drawings 10, 11, and 12.

10 and 11 are drawings of the right eye at different stages, a month apart. Note the retinitis circinata in 10 and the gross pigmentation in 11, with central choroidal changes. Drawing 12 shows gross pigmentation above and typical fine pigmentation at and round the macula. Angioid streaks are abundant in both eyes.

Seen again in October, 1926, V. in right 6/60, left still 6/6.

The right fundus showed an angioid streak passing through the macula, white patches of exudate round the macula, resembling those seen in retinitis circinata, and minute punctate haemorrhages in the deeper layer of the retina.

This is the point of interest in the case as it supports the view that, even if the streaks are not vessels, they are associated with vascular disturbances in the deeper layer of the retina or choroid, and are closely related to retinitis circinata and Coats's disease.

CASE 3. (Drawings 5, 6, 7)

I first saw this patient in April, 1928.

S. N., aged 41 years, butcher. Brother of the two preceding cases.

History.—His sight had been failing since 1923, which he attributed to fatigue after a long drive in a car.

Three years ago, he received a blow on the right eye from a piece of bone whilst chopping meat; the eye was painful for a few days, but he did not notice anything else. The sight in the right eye has got worse lately.

He is a strong robust-looking man—he is a butcher by trade and looks it—drinks up to 10 whiskeys a day, smokes 25 cigarettes a day.

No septic trouble found in throat, nose, or teeth.

He has had no illnesses beyond minor ailments of childhood, and appendicitis, for which he had an operation.

The report on his heart states, reduplication of 1st mitral sound, B.P. 140/85. Pulse full, regularly irregular 96 per min.—urine normal.

The blood count shows no evidence of any pathological change and is regarded as normal. The W.R. is negative.

He had difficulty in reading. He can see to drive a car in daylight but not at night (subsequently he ran over and killed a man).

The family history is important.

His mother has good sight—a sister of her's has been blind since birth.

The family consists of six members.

Sister aged 52 years. Sight failed suddenly in both eyes, 10 years ago.

Sister aged 47 years. Good sight.

Brother aged 45 years. Good sight.

Brother aged 42 years. Sight failed three years ago.

Patient aged 41 years. Sight failed one year ago.

Brother, aged 35 years, good sight.

On examination Ps. = active T. normal.

V. right $< 6/60 <$ J.14. Left 6/9 J.1 slowly and with difficulty.

There is no error of refraction.

His visual fields, right and left, show some constriction on the temporal side.

Right eye no colour-perception. Left, partial central scotoma for colours.

Fundi.—Right O.D. slightly blurred margin; central vessels appear raised but no measurable swelling. There is a pale area surrounding the disc.

The choroid between the O.D. and macula has a mottled appearance.

The central macular area is occupied by a dense scarred area, buff coloured, " tadpole "-shaped, with its tail towards the O.D., and beyond this another pale area, and beyond this again a semi-circular area of recent haemorrhage of the sub-hyaloid type.

There is a brown pigmented line running along the lower margin of the tail, resembling an angioid streak, and two definite angioid streaks to the nasal side of the O.D.

The left fundus resembles the right in the peculiar pale area round the O.D. and the fine mottled appearance of the choroid between the O.D. and macula.

There is a slight blurring of the O.D. and there is some disturbance at the macula. The angioid streaks were not noted at the first examination, but, when seen again at the end of April, I noted right and left O.D. slight optic neuritis and angioid streaks in both eyes.

The first drawings of his fundi were made in May, 1928, and by then the angioid streaks were quite definite in both eyes. He was seen again in July, 1928; the chief change was in the haemorrhage in the right, which was tending to break up into islands.

The second drawings were made in March, 1929. In the right eye the haemorrhage had absorbed, and left a dense mass continuous with the former central mass, with a second tail below, extending towards the lower part of the O.D. The pigmented angioid streak at the lower border of the first tail is less visible, presumably covered by the exudate. The retinal vessels pass over it and do not appear to be deflected by it—no raising or swelling of the mass was detected—otherwise it has some resemblance to the senile massive exudates. There are a few spots of exudate beyond its outer margin, suggestive of retinitis circinata. There is also a white spot, choroidal exudate or haemorrhage, to the nasal side of the O.D. lying in the course of an angioid streak which it interrupts—the streak resumes its course beyond the spot.

In the left eye, the angioid streaks appear more numerous. This may partly be due to more careful searching for them. The macula is definitely pigmented. There are also some fresh pigment-spots near the O.D.

CASE 4. (Coloured plate, left eye, and drawing No. 8, right eye).

Miss A. R., aged 41 years.

First seen in February, 1924. First noticed some difficulty in seeing with the left eye in October, 1923; previously, the right eye had always been the weaker.

Physical Examination.—Medical report negative. General health appears very good; she plays tennis and used to play hockey. Her neck is remarkably thin and there is apparent absence of any trace of thyroid. She is grey-haired since about the age of 24 years and is getting more so. The teeth were extracted in November, 1923, on account of her eyesight.

The possibility of syphilis is ruled out by her medical attendant.

The family history has been enquired into and is negative. This enquiry was made on account of the retinal pigmentation in and surrounding the macula, which I considered familial in type, and not because of the angioid streaks, the familial significance of which I was not familiar with at that time.

P. = active; T.N. R.V. $-$ 2·0 D. sph. $+$ 2·0 D. cyl. 30° = 6/12 × J.1.

Left $-$ 1·50 D. sph. $+$ 1·0 D. cyl. 190° = 6/18; letters in J.10 but J.12.

Fundi, right and left eyes, marked angioid streaks in both eyes, chiefly to the nasal side of the O.D.; where they run, they tend to encircle the O.D. On the temporal side they tend to follow the direction of the retinal vessels. The streaks run under the retinal vessels in several places. There is marked fine retinal pigmentation scattered over the central area, coarser in the right than in the left, but coming closer to macula in the left.

In the left, there is a small macular haemorrhage. Seen again two months later, the haemorrhage was absorbing and the vision slightly improved.

The visual fields were full. There was a central scotoma in the left eye, extending upward from the fixation point.

I saw this patient again in August, 1930, when she reported that her sight had remained satisfactory until April of that year, when the central vision failed in about the course of two weeks. The vision is now reduced to:— Right 6/24, left < 6/60.

In the right eye, there is but little change in the ophthalmoscopic signs to account for the failure of vision. But in the left, there is an extensive area of choroidal atrophy between the O.D. and the macula, with gross retinal pigment change.

The choroidal atrophy and pigmentation in this case are, I consider, typical of this disease, when compared with the central choroidal atrophy in the other cases.

It will be seen from the foregoing cases that the onset of the disease occurs in middle-life, between the ages of 30 and 40. The familial tendency to disease at this comparatively late period of life is interesting, as each case taken by itself might be supposed to be due to some acquired disease, and not to any hereditary tendency, but, taken in conjunction with other members of the family, it would appear to be due to the same inherited defect or tendency. The association of the angioid streaks in at least two members of the family may throw some light on the

clinical aspect of this obscure condition. The fact that angioid streaks are associated with choroidal disease appears to be proved by the reports of other cases.

Holloway[1] summarizes the evidence of a familial disease associated with the formation of angioid streaks as follows:—

"No definite statement has been made up to this time concerning *heredity* among the 60 cases of angioid streaks reported. Examples of this have been seen on four occasions; first, in 1897, by de Schweinitz, who observed two brothers (and suspected a third) with the condition; in 1914, by Spicer, who described the changes in a brother and sister; in 1923, Lederer observed two sisters similarly affected; and finally Wildi, in 1926, found two brothers with the affection. Thus, amongst 56 families, a familial tendency occurred in four instances, an incidence of 7·14 per cent. Even these figures are much too high for a coincidence, especially when we consider that familial characteristics probably were not looked for in half of the cases; if such an investigation had been made, it is possible that the actual incidence would be distinctly higher."

But the evidence for the existence of a familial choroidal disease becomes still stronger, when we bring into the picture the sister of the two brothers I report, and also the sister of the case narrated by Calhoun[2], both with bilateral choroiditis. It seems more than likely that, if there is a familial tendency to haemorrhage in the choroid, the same haemorrhagic tendency may be found in other organs in other members of the family. Thus, if inherited disease or weakness of the choroidal vessels can be established as an entity, it would be reasonable to look for a similar weakness or disease of the vessels in other parts of the body and in other members of the family. This point has been emphasized by Calhoun, writing on "The site of angioid streaks," when he says: "Inasmuch as angioid streaks usually involve both eyes, and as in some instances it has been noted that other members of the family have the same condition, an endeavour has been made to link the eye picture with some constitutional disturbance. Investigations, however, have been futile. The family history of this patient seems to confirm this suspicion, for the death of a brother at an early age from a heart attack, as well as a sister with bilateral choroiditis (which might have been an atrophy from haemorrhage and not an infection) strongly suggest some disease of the vascular system which might be familial in origin." The case of the sister which he reports corresponds to the case of the sister in the family I report, who had extensive bilateral choroiditis of vascular origin, without angioid streaks. This condition would appear to point to a vulnerability or weakness of the vessel walls.

The points which I hope to bring out by the narration of these cases are:—

(1) That there is a familial disease of the choroidal vessels, shown in its early stages by angioid streaks and other pigmentary changes of choroid and retina, and followed, in some cases, by gross central choroidal haemorrhages, which are again followed by further retinal and choroidal changes.

(2) That the disease is of slow onset, extending over many years, though its first evidence, bringing it to our notice, may be sudden gross haemorrhage, commonly at the macula, of the central choroidal or subhyaloid type.

(3) That it is a primary disease of the vessel walls and not secondary to any septic or inflammatory disease, though it may be associated with a similar vascular weakness in other parts of the body, in other members of the family, or in the same individual.

(4) That the angioid streaks are definitely of choroidal origin and probably due to a slow "seepage" from the choroidal vessels, and that angioid streaks are not an essential part of this familial choroidal disease, but that it may occur without them, and that, while they are definite evidence of the disease, their absence does not negative the nature of the disease.

(5) That they are associated with other changes, viz: some forms of retinal pigmentation at the macula and choroidal disturbance and pigmentation.

(6) That this choroidal disease may account for many forms of macular haemorrhage of the choroidal and subhyaloid type, and other forms of haemorrhage. Retinitis circinata occurs frequently in this disease and is associated with the macular haemorrhage stage; it tends to absorption with the subsidence of the haemorrhage, and when it persists it is evidence that the macular disease is still active.

(7) There is lack of information as to the after history of these cases, but, so far as it goes, it would appear to be of the same type as hereditary optic atrophy and neuritis, in that, its acute stage having been passed, the disease does not progress and the patients do not become blind; but this point requires further investigation.

I would suggest that the causation of these cases is best explained, clinically, by assuming that there is a slow form of oozing, or "seepage," from the choroidal vessels, without gross haemorrhage, but allowing blood to percolate through the vessel walls along the course of the choroidal vessels, giving rise to the angioid streaks, and that the same vascular weakness would account for the various forms of retinal and choroidal disturbance of pigment, found in this disease. "Seepage" may account for many obscure macular conditions without angioid streaks which

lack explanation of their causation, including some of the familial macular diseases. I would suggest that in investigating familial eye-disease it is important to carry one's investigation of the disease beyond the confines of the eye. Oozing may find its counterpart in haemorrhage from the lung or bowel, in other members of the family.

The evidence would appear to show that the disease is one of the vessel-walls only, and not due to any blood-condition. The weakness of the vessel-walls is further shown in the formation of aneurysmal dilatation, and their liability to gross haemorrhage, either spontaneously, or on slight injury.

Of the various forms of pigmentation in this disease, the most arresting is the angioid streak, but the disease gives rise also to almost all forms of pigmentary disturbance. In the grosser forms of central haemorrhage, the pigmentation may be of all forms, from some large central masses, resembling the "black spot" macula of the myope, to various forms of choroidal and retinal pigmentation. But the most interesting forms are those occurring before any gross haemorrhage has taken place, from the fine macular pigmentation to the small rounded spots seen in drawings Nos. 8 and 12. The fine retinal pigmentation of the macula is perhaps the most constant, and is similar to that of the familial macular disease. It was this condition which led me to examine the family history in Case 4—*not* the angioid streaks, the familial significance of which was unknown to me at the time.

There is one form of choroiditis peculiar to this disease. Small round choroidal patches occur in the course of the angioid streak, but do not interrupt it; it is continued beyond.

One author, Spicer[3], describing these peculiar patches, concludes that, as they do not interrupt the course of the angioid streak, they cannot be any form of vessel. But, if the view be taken that the angioid streak is formed round a choroidal vessel, and if, further, it can be shown that these choroidal vessels are liable to aneurysmal dilatations in their weakened walls, then the patches may be formed by exudate or haemorrhage surrounding the aneurysmal dilatation, and the course of the angioid streak would not be interrupted. Mr. Williamson-Noble's case (drawings 13 and 14) illustrates this point, showing both the enlargement of the streaks with dilatation at certain points, and in the same drawing, patches of this form of choroiditis in the course of the vessels.

Angioid Streaks in their relation to Injury

The relationship would appear to be rather obscure, and if angioid streaks are due to injury at all, they are a very late result. In the case reported by Doyne[4], there is a history of traumatism for each eye on separate occasions, and on each occasion the blow

was followed by temporary loss of vision, with central haemorrhage. It seems probable that the angioid streaks were not produced by the injury, but that the haemorrhage only occurred because of the peculiar condition of the vessels, which rendered them liable to rupture on slight provocation. The angioid streaks were there previously. Also, if traumatism by itself were a cause of angioid streaks, they would surely be much more common in cases of injury than they appear to be, even where a choroidal haemorrhage has taken place.

In one of my cases, there was a history of injury to one eye three years previously, but it is more than doubtful whether the injury caused the angioid streaks, as the injury was to one eye, and the streaks were in both. The same may be said in Mr. Williamson-Noble's case.

Angioid Streaks and Paget's Disease

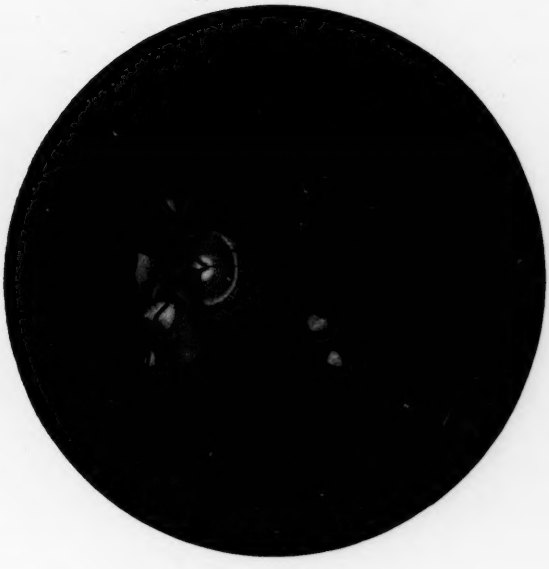
In the course of my researches in Hamblin's collection of drawings, I came across a case of Mr. Juler's (drawings 17 and 18) of angioid streaks associated with osteitis deformans (Paget's disease). The connection between the two diseases is worth noting, for F. H. Verhoeff[5], writing on " The Nature and Pathogenesis of Angioid Streaks in the Ocular Fundus," says:—

" I have recently seen a typical case in a patient with Paget's disease of the skull, but I am not prepared to say that this is of any special significance." The pathology of Paget's disease appears to be unknown, but Da Costa says: " The disease does not appear to be hereditary, although, in 14 instances, 2 or more cases occurred in the same family." There are, therefore, cases suggesting its hereditary or familial nature, and accordingly it is of interest to find a case of angioid streaks associated with this disease; and in the same connection, Mr. Summers' case (drawing 19) of subhyaloid haemorrhage associated with Paget's disease might be due to this choroidal disease which I am describing. The haemorrhage in his case is typical of this type of disease, although there are no angioid streaks. The concurrence of two such rare diseases can hardly be a matter of pure coincidence, and may throw some light on the pathology of both.

CASE 5. (Mr. Percival Hay's Case. Ref. 7). Drawing No. 9.

G. H., male, aged 37 years. Vision R. fingers at 1 foot. Left 6/60.
Exudative retinitis with angioid streaks.
? Coats's disease.
First attendance in June, 1927.
Had an operation for appendicitis two months before.
His health had been poor for some time but improved after the operation.
His sight began to fail in June.
His vision on his first visit was, right fingers at 6 inches. Left 6/60.

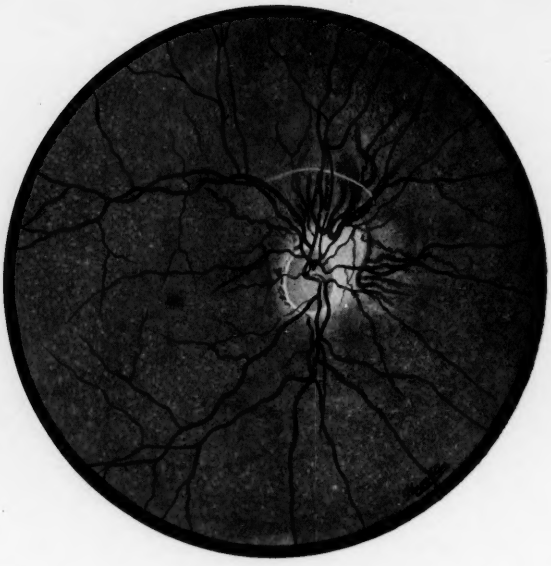
DRAWING 13.



DRAWING 14.

NOTE ON CASE 7—Drawings 13 and 14.

Drawings 13 and 14 show angioid streaks of an unusual type; they are much larger than any others I have found in published drawings, and show dilatation in places. Their colour is lighter and less pigmented than usual. Note the choroidal spots in the course of the angioid streaks.



DRAWING 15.

DRAWING 16.

NOTE ON CASE 8—Drawings 15 and 16.

Note the choroidal spot in left eye surrounded by angioid streak, and extensive very fine Tay's choroiditis.

DRAWING 17.

DRAWING 18. CASE 9.

Note angiod streaks in a case of Paget's disease.

DRAWING 19.

NOTE ON CASE 10—Drawing 19.

There are no angioid streaks, but the central haemorrhage and changes are typical of this class of choroidal disease. The changes were similar in both eyes.

Urine.—No sugar, no albumen.
W.R.—Negative.
Differential blood count.—Polymorphs. 56 per cent.
Eosinophils 3 per cent., basophils 0 per cent., small lymphocytes 25 per cent., large lymphocytes 14 per cent., large hyaline cells 2 per cent.
Extensive choroidal atrophy with isolated haemorrhages; peculiar grey lines like obliterated vessels branching in irregular fashion and not connected with retinal arteries or veins and not resembling choroidal vessels. Bands of fibrous tissue proceeding outwards from atrophic area.
Further notes of the case see *Trans. Ophthal. Soc. U.K.*, Vol XLVIII, p. 443, 1928.
The patient has since died. He lost his voice and the use of his right side two days before he died.
No other member of the family was seen.
See fundus drawing of right eye (No. 9).
The condition of the fundus was bilateral.

CASE 6. (Mr. Humphrey Neame's Case. Ref. 8). Drawings 10, 11, 12.

A. D., male, aged 44 years.
Case shown at meetings of *Section of Ophthalmology in* 1922 *and* 1923.
June, 1922.—Right macula, retinal haemorrhage.
August, 1922.—Circular, grey-white, raised patch in upper macular region with old and recent haemorrhage.
September, 1922.—Retinitis circinata faintly seen and angioid streaks noted.
October, 1922.—Retinitis circinata well-defined.
December, 1923.—Disappearance of white exudate of retinitis circinata and replacement by black strands. Persistence of swelling near the centre of the macula but less prominent. Small recent haemorrhage. Angioid streaks much as before.
December, 1927.—Angioid streaks as before. The right macular region shows if anything more dead white pallor and diminution or absence of swelling, with well-marked pigment proliferation overlying retinal vessels. The left macula is slightly mottled and has well-marked pigment proliferation chiefly above and to its nasal side.

CASE 7. (Mr. Williamson-Noble's Case. Ref. 10). Drawings 13, 14.

Mrs. N., aged 40 years.
October, 1929.—R. eye. Commotio retinae following blow by tennis ball 9 years ago.
Much scarring at macula.
Vision = fingers at 1 metre.
Left eye as drawn.
Vision c. + 0·5 D. sph. − 0·25 D. cyl. 45° = 6/5 full.
Birth normal. No family history of abnormal sight.
No history of fever or general disease.
No injury to left eye.
From her story the condition would appear to have been commented upon by an oculist in Jerusalem many years previously.

CASE 8. (Mr. Muirhead's Case. Ref. 9). Drawings 15, 16.

A. E., coal miner, aged 30 years, 1928.
Vision Right = 6/6 partly. Left, fingers at 15 inches.
Diagnosis.— (1) Optic atrophy; (2) Angioid streaks; (3) Retinal degeneration; (4) Subhyaloid haemorrhages; (5) Changes at left macula.
Clinical History.—Misses an object on the floor unless he is particularly looking at it. Night vision very bad. Could not stand naked light. Slow adaptation on entering and leaving coal pit. In 1926, vision of left eye failed rapidly.
All his systems were examined and X-ray examination revealed delay in the appendix region. He has since been operated on for appendicitis.
Field white. R.E. slight general contraction. L. E. marked general contraction.
Central colour V. Right eye difficulty between blue and green, below No. 2 (Lister) L. E. Total central colour scotoma, relative paracentral.

CASE 9. (Mr. Juler's Case). Drawings 17, 18.

E. R., aged 51 years, male.

December, 1923. V. Right 6/60 with − 1·50 D. sph. − 0·75 D. cyl. = 6/6.
V. Left 6/12 partly − 0·75 D. sph. − 0·75 D. cyl. at 45° = 6/6 partly.

Has been told that he has acromegaly, but this has been denied by other medical men.

He has " horse " type of head with square forehead and prominent jaw, but says that this has been exactly the same since birth.

Takes the same size in hats as previously, no change in size of extremities.

Dr. C. P. Symonds reports in 1924 that he has Paget's disease.

Fundi.—Angioid streaks present in both eyes running beneath upper and lower nasal vessels. Left O.D. slightly blurred at upper and lower margins, but otherwise normal.

May, 1925.—Symptoms of migraine, vision as before. Angioid streaks as before.

CASE 10. (Mr. T. Collyer Summers' Case. Ref. 11). Drawing 19.

Subhyaloid retinal haemorrhages in both eyes associated with Paget's disease.

Female, aged 57 years.

X-rays show typical and advanced bony changes of Paget's disease.

The bony changes involved both upper and both lower extremities, the pelvis, skull and spine, leading to considerable deformity of legs and arms.

The blood calcium was normal.

Shown by D. Evan Bedford at the Association of Physicians Meeting, Summer, 1930.

To summarize:—

This choroidal disease has its onset in middle life, round about 40 years of age. It is not associated with any syphilitic, tuberculous, or septic cause, and is not inflammatory in origin, but primarily a vascular disease. It is probably an inherited disease, and often familial. It affects both eyes. The earlier symptoms are a pallor surrounding the O.D., fine pigment changes at the macula and central area and angioid streaks, without necessarily any loss of vision. The later symptoms are central macular haemorrhages and exudation, associated with retinitis circinata. These in turn tend to absorption, giving rise to extensive choroidal atrophy, with scattered gross pigmentation, and later still to retinitis proliferans. The same choroidal disease occurs without angioid streaks. If the association of angioid streaks with this form of choroidal disease be considered established, the prognosis in cases showing angioid streaks should be very guarded even where there are full vision and no symptoms. They may exist for many years before any central haemorrhage occurs.

I am indebted to the authors of the cases, other than my own, for the use of their drawings and notes, also to Messrs. Hamblin

Note on Case 9.—Since the above was written, Mr. Juler has seen the patient again, and reports that the V. = Rt. 6/9. Left 6/6 partly. The streaks are definitely larger and more numerous.

for the use of their collection of ophthalmic drawings, but for which I could not have got these cases together.

REFERENCES

*1. **Holloway, T. B.**—Angioid streaks: a report concerning two cases. *Trans. Amer. Ophthal. Soc.*, Vol. XXV, pp. 173-208, 1927.
2. **Calhoun.**—*Trans. Amer. Ophthal. Soc.*, Vol. XXV, p. 209, 1927.
3. **Spicer.**—*Oph. Sec. Proc. Roy. Soc. Med.*, Vol. VIII, 1915.
4. **Doyne.**—*Trans. Ophthal. Soc. U.K.*, Vol IX, p. 128, 1889.
5. **Verhoeff, F. H.**—Presession Book of the Section of Ophthalmology of the American Medical Association. 1928.
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7. **Percival Hay.**—*Trans. Ophthal. Soc. U.K.*, Vol. XLVIII, p. 443.
8. **Neame, Humphrey.**—Macular degeneration after retinitis circinata. *Oph. Sec. Roy. Soc. Med.*, Vol. XXI, December, 1927.
9. **Muirhead.**—*Trans. Ophthal. Soc. U K.*, Vol. XLVIII, p. 446, 1928.
10. **Williamson-Noble.**—Hamblin's collection of ophthal. drawings.
11. **Summers.**—Hamblin's collection of ophthal. drawings.

* There is a full list of references given at the end of Holloway's paper on angioid streaks.

ANNOTATION

Bust of Mr. MacCallan unveiled at Giza

An interesting ceremony took place at Giza on March 13, when H. E. the High Commissioner of Egypt unveiled a bust of Mr. MacCallan to commemorate his 20 years' service as Director of the Egyptian Ophthalmic Hospitals. This bust, an illustration of which is included here, through the courtesy of the artist, Mr. F. Doyle-Jones, A.R.B.S., has been subscribed for by Mr. MacCallan's friends, pupils and colleagues in the Egyptian ophthalmic service. It will be remembered that Mr. MacCallan retired from Egypt in 1923, and that an annotation dealing with his work there appeared in our columns early in 1924. At the present time it is only necessary to offer our congratulations to Mr. MacCallan that his pioneer work in Egypt should have been recognized by his foreign associates and pupils in this practical manner.

When Mr. MacCallan first entered on his work Egypt was indeed a land of darkness. Much has been accomplished to ameliorate this terrible state of affairs, and the good work is surely progressive. It will probably take years to bring the figures of Egyptian blindness within reasonable limits, but Mr. MacCallan will have the satisfaction of knowing that his work has been appreciated by all concerned with this ancient country; we hope that the bust will keep his memory green as long as

bronze endures. No one in any way connected with Egypt during the opening years of the present century has a greater title than Mr. MacCallan to those well-worn lines from Lucretius, *De Rer. Nat.* iii, 1, 2.

" E tenebris tantis tam clarum extollere lumen,
Qui primus potuisti inlustrans commoda vitae."

for his work and teaching have been the means of bringing light out of great darkness to many inhabitants of that country.

VOLUNTARY HOSPITALS OPHTHALMIC CLINICS

THE following has been received from Mr. R. A. Greeves. It is based on information furnished by the Secretary of the Royal London Ophthalmic Hospital.

The provision of ophthalmic benefit as an additional benefit for their members by many of the leading Approved Societies placed the hospitals in a position of considerable difficulty, inasmuch as two distinct and conflicting problems had to be satisfactorily solved.

In the first place the treatment of patients entitled to such benefit is contrary to the principle governing the administration of voluntary hospitals and infringes the relevant regulation which debars

both those able to pay an ophthalmic surgeon's fee and also those on whose behalf such fee is available.

Secondly, to refuse treatment to patients who come definitely within what is loosely termed the "hospital class" is obviously open to grave criticism.

For a time the ophthalmic hospitals of London (and also many of the provincial ophthalmic hospitals and general hospitals) refused treatment to these patients—except those whose condition necessitated immediate treatment—and referred them to their panel doctor in order that they might be provided with the necessary certificate to enable them to obtain ophthalmic benefit.

While theoretically adequate provision was made for these patients by the Approved Societies, there were aspects of considerable importance which could not be ignored, and which made it obvious that the tentative arrangements made by the hospitals could not be perpetuated without to some extent jeopardising the goodwill of the voluntary hospitals in general and the ophthalmic hospitals in particular.

The following were the chief reasons which made it essential that some alternative arrangement should be devised:—

(1) Statistics showed that a considerable percentage of the patients precluded from treatment on the grounds of apparent eligibility for ophthalmic benefit subsequently attended sight-testing opticians, some at the instigation of their societies and others upon their own initiative. To have persisted in the original procedure adopted would, in effect, have been to condone this procedure of the Approved Societies.

(2) Many patients came from considerable distances unaware of the arrangements in force at the hospitals and were not unnaturally aggrieved at being refused treatment. There is little doubt that a continuance of the arrangement would have alienated to a considerable degree the status and reputation which the hospitals enjoy.

(3) It was undesirable to relieve the Approved Societies of the financial obligations to which they had committed themselves by including ophthalmic benefit in their scheme of additional benefits.

While these difficulties affected in varying degrees all voluntary hospitals, the position of the ophthalmic hospitals was one which necessitated that an alternative arrangement be provided as soon as it was possible to formulate a scheme which would be acceptable to the hospitals concerned, and would meet with the requirements of the Ministry of Health and the approval of King Edward's Hospital Fund.

A joint committee of the ophthalmic hospitals was therefore formed to review the situation, and as a result of its deliberations

a scheme was evolved designated " The Voluntary Hospitals Ophthalmic Clinics " scheme, under which special evening clinics have been established at each of the ophthalmic hospitals in London.

The scheme provides a private consultation by an ophthalmic surgeon—the fee for which is 10/6—and the provision of any necessary glasses. In the event of it being found that further treatment is essential, the patient is referred to his local general practitioner or to the ordinary hospital out-patient clinic, according to the particular circumstances of the case.

Although the scheme was formed primarily for insured persons eligible for ophthalmic benefit, it has been found desirable to extend its scope and, under certain conditions, members of the Hospital Saving Association and non-insured persons are eligible to take advantage of the facilities offered.

The following schedule gives details of the categories of patients and the conditions upon which they are received for treatment :—

(*a*) Members of Approved Societies entitled to ophthalmic benefit. (These patients are admitted upon production of a special form from their Society showing what grant will be made towards the cost of consultation and glasses).

(*b*) Contributors to the Hospital Saving Association. (These patients are admitted upon production of Form O.S.9 (Eye Clinic Voucher) duly completed).

(*c*) Those whose incomes are within the following prescribed limits and who are able to sign a *declaration to that effect and to pay an ophthalmic surgeon's fee of 10s. 6d.

(*The necessary form of declaration is supplied by the hospital)

		Per week.
Single:	Without dependents, living with relatives and only contributing to board and keep	£4 0 0
	Living alone and paying all expenses	£4 10 0
	With dependents	£5 0 0
Married:	Without dependents	£5 0 0
	With dependents (including children under 16 or other relatives living with or wholly dependent upon)	£6 0 0

The fee of the ophthalmic surgeon is 10s. 6d. (payable to the hospital at the clinic) and the cost of glasses as provided at the hospital is as follows :

Solid nickel	7/6
(The charge to patients in groups (*a*) and (*b*) may be 4/6).	
Rolled gold	15/-
Shell (imitation)	22/6

In certain exceptional cases an additional charge is made for special lenses which may be required.

The inauguration of the new scheme has enabled the co-operating voluntary hospitals to emphasize to a considerable proportion of the community that in their own interests it is desirable that those who require an examination of their eyes should have this important function carried out by an ophthalmic surgeon: thus the recommendations so emphatically urged both by the committee appointed by the Ministry of Health to consider the Optical Practitioners' Bill and the committee appointed by the Council of British Ophthalmologists in 1922 "To consider the question of sight-testing by opticians" are being carried into effect.

The scheme has received the official sanction of the Ministry of Health and of King Edward's Hospital Fund, the latter body stipulating that the hospitals must evolve a method by which they are enabled to be reimbursed for charges incurred in connection with the administration of the scheme.

Clinics have now been inaugurated at the following hospitals:—

Central London Ophthalmic Hospital.

Royal Eye Hospital.

Royal London Ophthalmic Hospital
(Moorfields Eye Hospital).

*Royal Westminster Ophthalmic Hospital.

Western Ophthalmic Hospital.

*(Clinics at this hospital are available only for

(*a*) Members of Approved Societies entitled to ophthalmic benefit, and

(*b*) Other insured persons who are willing to pay the ophthalmic surgeon's fee of 10s. 6d.)

The Ministry of Health has expressed the desire that the services offered to insured persons under the scheme shall be available over as large an area as possible. Many of the provincial ophthalmic hospitals, and both London and provincial general hospitals with ophthalmic departments, have tentatively signified their acceptance of the general principles of the scheme, and now that clinics have been successfully inaugurated by the London ophthalmic hospitals the joint committee hopes and believes that the scheme

will be materially extended in the near future, and will be pleased to receive applications from hospitals wishing to co-operate.

Note:—The following are now available in pamphlet form, and can be obtained on application from the Secretary, Royal London Ophthalmic Hospital (Moorfields Eye Hospital), City Road, E.C.1 :—

V.H.O.C.1. Details of the scheme for the information of Approved Societies and their members and other persons entitled to receive treatment under the scheme, and

V.H.O.C.2. Details of the administration of the scheme for the guidance of co-operating hospitals.

ABSTRACTS

I.—NEUROLOGY

(1) **Mathewson, G. H. (Montreal).—Primary tumours of the optic nerve.** *Amer. Jl. of Ophthal.*, October, 1930.

(1) **Mathewson's** article opens with a summary of the literature on this subject with special reference to Hudson's valuable paper (*Roy. Lond. Ophthal. Hosp. Reps.*, 1912, Part 3, p. 317). He divides tumours of the optic nerve into three classes (1) Glioma due to overgrowth of glial tissue. (2) Meningioma, growing from the sheaths of the nerve and (3) Fibroma, growing from the fibrous tissue of the nerve sheath. Gliomata are the commonest tumours and occur usually at the age of about 13 years, though the extreme limits are 18 months and 62 years. Visual disturbance usually precedes proptosis and limitation of movement is fairly common and of early appearance. The average age for appearance of meningiomata is 35 years, though one has been seen at 10. Visual disturbance usually occurs after the proptosis, and limitation of ocular movement is less common and of late appearance. Mathewson's case occurred in a woman aged 47 years who had had proptosis for five years and failing vision for three. The tumour was removed by Krönlein's operation and was found to fill the orbit. Microscopically it was found to grow from the arachnoid, the cells being uniform in size, with vesicular nuclei and often arranged in whorls. Complete ptosis followed the operation but otherwise the patient made a good recovery. Optic nerve tumours are relatively benign, so the prospect of a recurrence is unlikely.

F. A. W-N.

(2) **Symonds, C. P. (London).—Retrobulbar neuritis and disseminated sclerosis.** *Lancet*, July 5, 1930.

(2) The last sentence of **Symonds's** article may be quoted first in order to show the author's main text. " It follows that in a case of retrobulbar neuritis of obscure origin disseminated sclerosis remains a possible cause, even if no further signs of this disease have developed after a period of 10 or 15 years." This fact was recently recognized by W. R. Brain (*Quart. Jl. of Med.*, 1930, No. 91, p. 343) and Symonds takes up the point in the light of his own experience. The frequency of retrobulbar neuritis as a symptom of disseminated sclerosis is a subject which he has carefully studied in private practice and he has found it advisable to search carefully for a history of symptoms of retrobulbar neuritis which the patient may have forgotten or may have failed in any way to connect with his symptoms of disseminated sclerosis. In a series of 139 cases of disseminated sclerosis a history of an attack of retrobulbar neuritis was obtained in 39, or 28 per cent. Further, in this series of cases the onset of retrobulbar neuritis preceded all other symptoms in 20 cases. The interval between this retrobulbar neuritis, regarded by the ophthalmologist as of obscure origin, and the appearance of the other signs of disseminated sclerosis varies very greatly. In the 20 cases referred to the intervals were as follow:—

Under 2 years in 10 cases.
Over 2 years but under 5 years in 5 cases.
Over 5 years in 5 cases.

Three case histories follow in which the interval was respectively 17, 10, and 18 years.

In view of the aetiological difficulties in which ophthalmologists are apt to find themselves when dealing with retrobulbar neuritis for which no cause is apparent, this short article by a neurologist is of very great interest and importance.

ERNEST THOMSON.

(3) **Cohen, Henry (Liverpool).—Retrobulbar neuritis and disseminated sclerosis.** *Lancet*, July 12, 1930.

(3) Referring to the article by Symonds on the above subject in the previous number of the *Lancet*, of which an abstract appears above, **Cohen** relates a case in which the interval between the retrobulbar neuritis and the other symptoms of disseminated sclerosis was 22 years. He also points out that the initial symptoms other than ocular may precede the more marked development of the disease by a long period. Thus, in one of this author's cases a " useless right arm " and numbness of the left leg preceded the other symptoms by 25 years.

ERNEST THOMSON.

(4) **Paton, Leslie (London). — Classification of the optic atrophies.** *Lancet*, October 18, 1930.

(4) **Paton's** address to the Royal Society of Medicine on October, 9, 1930, is fully summarised in the *Lancet*, and, since by no means all of the readers of this journal are members of the Royal Society of Medicine one may be allowed, in order to show how the author throws off the shackles of the text-books, to make one or two quotations from the *Lancet's* account.

" Attempts to attain great simplicity in classification of the atrophies could only be harmful. A perfect system should be completely inclusive and exclusive; it should include all cases in one or other of its sub-divisions, and each case should be embraced in one sub-division and excluded from all the others—this last condition was impossible to satisfy . . . . Nothing could be more misleading than the use of ' primary ' and ' secondary ' as commonly applied to cases of optic atrophy. Primary should be applied to an atrophy of the optic nerve in which the toxin or the trauma acted directly on the nerve fibre and killed it; and, similarly, a secondary atrophy would be that form in which the death of the nerve-fibre was a consequence of inflammation or degeneration of other structures on which the nerve was dependent. These meanings, however, were far from those given in the text-books . . . . He would have the terms ' primary ' and ' secondary ' entirely abolished from books dealing with optic atrophy." It is impracticable further to compress the *Lancet* synopsis. Enough has been said by way of quotation to show the drift of the author's intentions. For his grouping of atrophies of the optic nerve the reader should refer to the original.

ERNEST THOMSON.

II.—THERAPEUTICS

(1) **Cowan, Alfred (Philadelphia).—Subconjunctival injection of Pregl's solution in gonorrhoeal ophthalmia.** *Arch. of Ophthal.*, March, 1930.

(1) Pregl's solution is a complicated hypo-iodite preparation which has produced good results when passed directly into the prostate in cases of gonorrhoeal infection of this organ. **Cowan's** paper gives an account of its use in 6 cases of gonorrhoeal conjunctivitis in adults. The technique is as follows. After thorough irrigation of the eye with boric lotion and the instillation of a drop of 1 per cent. holocaine hydrochloride, 15 minims of Pregl's solution is slowly injected into the highest point of the oedematous conjunctiva, the injection being repeated every day

as long as gonococci are found in the secretion. The treatment is combined with the ordinary use of lotion, atropine, etc. Although the cases were severe, useful vision was lost in only one eye and this was in a man aged 73 years, whose cornea was nearly opaque on admission. The duration of the disease varied from 13 to 5 days.

F. A. W-N.

(2) **Veil, P. (Paris).—The action of natural ephedrine on the eye. (L'action de l'éphédrine naturelle sur l'Oeil).** *Arch. d'Ophtal.*, June, 1930.

(2) Ephedrine, an alkaloid obtained from *ephedra vulgaris*, a plant widely distributed over Central Europe and Asia, was isolated in 1877, at Tokio, by Yamanashi and Nagai. After a period of neglect this medicament has recently been brought to the notice of practitioners and has been used in general therapy as a vaso-constrictor and anti-asthmatic. It has not been employed to any extent as a mydriatic, but in the opinion of **Veil** it has distinct merit for this purpose.

Merck obtained from the same plant, *pseudo-ephedrine*, which has the same formula, and the same chemical properties, but is dextro-rotatory, whereas the alkaloid isolated by Nagai, is laevo-rotatory.

Synthetic ephedrine (called *ephetonine*) has also been produced. The writer of this paper gives a detailed account of his own observations and those of other experimenters on the action of this alkaloid on the eye, and adds a list of papers up to 1929. His conclusions are:—

The hydrochlorate of (natural) ephedrine in a 3 per cent. aqueous solution is a painless mydriatic much superior to adrenaline. It is preferable to euphthalmine, the action of which is slower and less constant. Ephedrine does not affect the accommodation at all, nor does it alter the ocular tonus. Possessing these properties it deserves to be employed in ocular therapeutics, to obtain mydriasis for ophthalmoscopic examination, or for improving visual acuity in the presence of axial opacity of the lens. It may also be usefully added to atropine in attempts to break down synechiae.

J. B. LAWFORD.

(3) **Majewski, K. W. (Cracow).—Concerning the mechanics of detachment of the retina in myopes. (Sur le Mécanisme du décollement de la Rétine chez les Myopes).** *Arch. d'Ophtal.*, May, 1930.

(3) In **Majewski's** opinion two theories concerning the pathogenesis of spontaneous detachment of the retina hold the field: that put forward by Arlt, and that upheld by Leber and

Nordenson. Each of these has numerous supporters, reference to many of whom is made by Majewski. After discussion of these hypotheses and various modifications suggested by later writers, he expresses the view that all theories based upon an inflammatory origin should be eliminated. He notes with surprise that the advocates of the different theories give little or no attention to the profound anatomical changes which are the inevitable consequences of progressive myopia, especially the increase in size of the globe. This affects particularly but not exclusively its antero-posterior measurement.

The writer deals at length with the relation (from the mechanical side) of this augmented size of the eyeball to detachment of the retina, and adduces statistics and mathematical calculations in support of his views.

In the following paragraph (literally translated) Majewski endeavours to " state with precision " the mechanical conditions which exist in an eyeball affected by progressive myopia and to explain that these conditions lead inevitably to fluidity of the vitreous, and that in certain cases the same mechanical factors may be the cause of detachment of the retina, which is incapable of unlimited expansion.

" We know that high myopia leads to notable augmentation of the eyeball, which we may assume to be approximately spherical. Now the surface of a sphere which enlarges, increases proportionately to the square of the radius, and the volume proportionately to the third power of the radius. Let us take a simple example and suppose that the radius is increased to double its length. In such a case the surface is quadrupled and the volume increased eight times. It is clear that under these conditions the membranes forming the envelope of the eye must undergo a high degree of distension, whilst the vitreous body which is insufficient to fill completely the enlarged cavity, imbibes fluid from the surrounding tissues. In this way arises synchisis of the vitreous. As to the ocular membranes, the sclera, more extensile than the others, becomes stretched and thinned, without creating thereby any serious disturbance in the functions of the eye. The choroid continues to line the enlarging fundus of the eyeball, becoming thinned and in some instances widely atrophied. On the other hand a membrane so fine and delicate as the retina cannot tolerate stretching to an indefinite degree. What happens? The retina becomes detached, separated from the wall which it is no longer capable of covering."

Majewski draws a sharp distinction between two types of myopic enlargement of the eyeball; that in which the increase is more or less uniform and an approximately spherical shape is maintained: the other (designated as " regional " or " ellipsoid ") in which

the increase is chiefly in the antero-posterior diameter, and the shape of the globe becomes irregularly oblong.

In eyes which become enlarged spherically or nearly so, the distension of the retina is incomparably greater than in those which become ellipsoid. Consequently the conditions are more favourable to detachment of the retina in the first group than in the second. To determine whether detachment does occur with greater frequency in spherically distended eyeballs or in those with " regional " distension, examination and measurement of a number of eyeballs after removal or in the cadaver is essential.

J. B. LAWFORD.

BOOK NOTICE

Coal-Miners' Nystagmus. By G. F. HAYCRAFT, M.R.C.S., L.R.C.P., D.O.M. & S. Oxford Medical Publications. 1931. Price 1s.

THIS booklet of 15 pages gives a clear and accurate account of the signs and symptoms of miners' nystagmus. The author, while not claiming that the description is exhaustive, hopes that the booklet will assist newly qualified practitioners. There is no room for a guide to the literature but the author should have mentioned that such a guide is to be found in the "First Report of the Miners' Nystagmus Committee " Special Report, No. 65 of the Medical Research Council.

The description of the condition follows the usual lines but special attention is drawn to the contraction of the fields of peripheral vision said to exist. This contraction was first described by Cridland but most ophthalmic surgeons do not lay any stress on this sign. The aetiology is discussed and although the author throws his weight on the side of the hypothesis of deficient illumination, he does not consider the question decided and thinks the possibility of a chronic poisoning should not be dismissed. " Fatigue of the retina forming a part of a general nervous fatigue is a predominant cause of the symptom complex which we know as ' miners' nystagmus '."

The treatment suggested is cessation from pit work and employment on the surface. The suggested treatment of sleeplessness by hyoscine should be confined to in-patients and Dr. Haycraft has had success in treating severe cases with rest in bed, hyoscine and ultra-violet rays. Outdoor treatment with ultra-violet rays was not successful.

This booklet is easier to read than the " First Report " but perhaps the more authoritative document is worth the extra sixpence that it costs.

OBITUARY

Mr. Percy Dunn

THE recent death of Mr. Dunn was briefly referred to in our last issue. The son of a north-country parson, Mr. Dunn was born 76 years ago, at Warkworth, Northumberland. Educated at Richmond and Clapham, he entered St. Bartholomew's Hospital and subsequently studied in Paris. He qualified M.R.C.S., in 1876, and took the F.R.C.S. Eng. four years later. For many years he was Ophthalmic Surgeon to the West London Hospital, where he took an active part in organizing the post-graduate medical college of the hospital. He also took a large share in the work of the West London Medico-Chirurgical Society, of which he was, at one time, Secretary and Vice-President.

Apart from professional work of this kind he was recognized as an efficient medical journalist. He edited at one time the *Franco-British Medical Review*; from 1896 to 1904 he edited the *West London Medical Journal*, and later the *Medical Press and Circular*, and the *Bulletin of the Fellowship of Medicine*.

Some of our earlier volumes are enriched by contributions from his pen to the Masters of British Ophthalmology series, notably, the Memoirs of James Ware and Benjamin Travers.

NOTES

Death

As we go to Press we regret to record the death of Mr. Edward William Wood White, M.D., of Birmingham, in his 77th year.

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Appointments

Mr. L. H. Savin and Mr. Arnold Sorsby have been elected Assistant Surgeons to the Royal Eye Hospital.

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Oxford Ophthalmological Congress

The Twenty-first Annual Meeting will be held at Keble College, on July 8 to July 11. The following arrangements have been made.

July 9. Symposium on "The Diagnosis of Intra-cranial New Growths." The openers will be Mr. Leslie Paton, from the

Ophthalmological Standpoint; Sir Percy Sargent, from that of the Neurological Surgeon; Dr. H. M. Traquair, on the aspect of Perimetry; and Dr. Artur Schüller, of Vienna, on the Radiological aspect.

In the afternoon Prof. Elliot Smith will give an address on "The Evolution of the Instruments of Vision."

July 10. The Doyne Memorial Lecture will be delivered in the forenoon by Mr. Philip E. H. Adams, of Oxford. An address on "Tonometry" will be given by Dr. Bailliart: and there will be a discussion on "Penetrating Wounds of the Eyeball," to be opened by Mr. James Craig, of Belfast, and Dr. Artur Schüller, of Vienna.

Other papers have been promised by Mr. Rugg-Gunn, Dr. Bernard Samuels, of New York, and Prof. Curran, of Kansas City. The Friedenwald Ophthalmoscope will be demonstrated.

The Annual Dinner will be held in the Hall of Keble College, on Thursday, July 10.

Demonstrations in the Scientific and Commercial Museums have also been arranged.

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North of England Ophthalmological Society

At the Annual Meeting of the North of England Ophthalmological Society on March 20, the following members were elected to the Council:—President: Mr. Percival J. Hay, Sheffield. Vice-President: Mr. J. Duff McCulloch, Bradford. Members of Committee: Mr. S. D. Lodge, Leeds, and Mr. F. Gamm, Huddersfield. Treasurer: Mr. W. H. Kiep, Bradford. Secretary: Mr. Percival J. Hay, Sheffield.

FUTURE ARRANGEMENTS

1931

June 5.—Midland Ophthalmological Society, at Cheltenham.
June 12.—Section of Ophthalmology, Royal Society of Medicine. (Annual Meeting).
July 8-11.—Oxford Ophthalmological Congress, at Oxford.
July 22-24.—Annual Meeting, British Medical Association, at Eastbourne.
October 6.—Midland Ophthalmological Society, at Birmingham.
December 1.—Midland Ophthalmological Society, at Birmingham.

CONTEMPORARY OPHTHALMIC LITERATURE

American Journal of Ophthalmology. *March, 1931.*

HOLLOWAY and COWAN. Concerning lamellar membranes of the anterior surface of the lens.
GREEN. Management of orbital infections.
VAIL, JR. Orbital complications in sinus disease.
YOUNG. Bee sting of the cornea.
KOLMER. The bacteriological and immunological aspects of iritis.
SCHNABEL. Endogenous infections in the etiology of acute iritis.
HOLLOWAY. Evaluation of etiologic factors in acute iritis.
MORTON. Hypothesis regarding so-called amblyopia ex anopsia.

Archives of Ophthalmology. *February, 1931.*

WHEELER. Exophthalmos associated with diabetes insipidus and large defects in the bones of the skull.
FRIEDENWALD, J. S., and RONES. Ocular lesions in septicaemia.
CASTROVIEJO. The pathology of chronic simple glaucoma.
O'CONNOR. Ocular tendon transplantations: three new methods.
HARTGRAVES and KRONFELD. The synergistic action of atropine and of epinephrine on the intrinsic muscles of the eye.
ZENTMAYER. Primary sarcoma of the iris: removal by iridectomy: no recurrence in three and a half years.
FERREE, RAND and SLOAN. Sensitive methods for the detection of Bjerrum and of other scotomas.
FEIGENBAUM. Reflex transmission of stimuli from one eye to the other. The "dark-light" test following neurectomy.
REESE. Extension of glioma (retinoblastoma) into the optic nerve.
WILLIAMS. Mechanism of some convulsive movements of the orbicularis and of the face. The manner of their removal.

Annales d'Oculistique. *February, 1931.*

Ernst Fuchs.
CHARLIN. The syndrome of the nasal nerve.
SAINT-MARTIN. On the efficacy and the diagnostic importance of the vaso-dilators, acetyl-choline in particular, in spasm of the retinal vessels.
MARX. Simultaneous registration of the intra-ocular tension and the pressure of the cerebro-spinal fluid.
TERSON. Very marked lacrimal ectropion treated by submucous injections of double chlorhydrate of quinine and urea, 5 per cent.
RIFAT. A case of ophthalmia in one eye and microphthalmia in the other in a congenital syphilitic child of the second generation.

Archives d'Ophtalmologie. *March, 1931.*

CANGE and DUBOUCHER. Cysts and fistulae of the lacrimal gland.
WEEKERS and HUBIN. Results obtained from iris inclusion in glaucoma.
VILLARD. The evolution of a sympathetic ophthalmitis ending in cure.
FRENKEL. Reflections on certain terms used in ophthalmology.
CHARAMIS. On two cases of congenital anomaly of the lacrimal passages.

Revue d'Oto-Neuro-Ophtalmologie. *January, 1931.*

GUILLERMIN and CHAMS. Alterations in the retinal arterial tension in endonasal operations.
PESME. Macular hemianopic scotoma with hemi-achromatopsia.
NORDMANN. Some remarks on the examination of peripheral oculo-motor paralyses.

Société d'Ophtalmologie de Paris. *December, 1930.*

NICOLAS and GATÉ. The continued, intermittent and regular treatment of syphilis should rest on the basis not only of therapeusis but also of prophylaxis.

MARCENAL and LEMETAYER. Sub-conjunctival autohaemotherapy in the horse.

BAILLIART. Conjunctival oedema and glaucoma.

CHEVALLEREAU. Parasitic affection of the eye.

VELTER, SOURDILLE and DUPUY-DUTEMPS. Orbital tumour with exophthalmos and macular changes.

PRIEUR and TRENEL. Monilethrix and early cataract.

BOURGUET and NIDA. Temporal hemianopia of the right eye with visual acuity of 2/50. Blindness of the left eye. Diagnosis: subsellar meningioma. Operative diagnosis: cysto-adenoma of the hypophysis.

BOURGUET. Tumour of the hypophysis operated on by the endonasal route.

GALLOIS. Acetylcholine in a case of chronic glaucoma with extreme reduction of the visual field.

MONBRUN and GUILLAUME. Bilateral ophthalmoplegia and papilloedema. Cure. Indications for ventricular puncture.

BISTIS. On a case of retinitis with aglycosuric hyperglycaemia.

REBOUL. Frontal gumma and extrinsic ophthalmoplegia with disturbance of sensation and enophthalmos.

Archiv für Ophthalmologie. *February, 1931.*

BIELSCHOWSKY. Unilateral and opposite (dissociated) vertical movements of the eyes.

OHM. On nystagmus.

JAENSCH. On the clinical aspect of supra-nuclear medialis paresis and internuclear ophthalmoplegia.

MÜLLER. On the representation of the course of dark adaptation in the form of a curve for clinical investigation.

——— On the influence of previous illumination of varying duration on dark adaptation and on the magnitude of error in determining the increase during its passing off.

TOWBIN. On the histological changes in Denig's mucous membrane graft.

GOLDMANN and ROLETT. On so-called ultra-red cataract.

Klinische Monatsblätter für Augenheilkunde. *February, 1931.*

KOYANAGI. Further observations on the pathogenetic changes in the vessels of the choroid in albuminuric retinitis.

BÜCKLERS. On a new slit-lamp appearance of the superficial surface of the cornea.

——— Sickle-shaped changes in the epithelium.

POOS. On the toxico-inflammatory effects of some of our usual alkaloids in the eye.

FLEISCHER. Is there an isolated sympathetic choroido-retinitis?

STEIN. Heterotopia of the macula following traction by the scar after cautery puncture for detached retina.

KUKÁN and KOCZKÁS. Observations on *chalkosis corneae* and the spectroscopy of the cornea.

PALLARÉS. *Degeneratio disciformis maculae luteae.*

KOLEN. On a case of unusual *arcus senilis* with superficial new formation of blood vessels.

VANCEA. Spontaneous orbital haematoma. *(Endothelitis haemorrhagica orbitalis).*

POCHISSOFF. A new marginal plastic operation for trichiasis.

GOLDFEDER. Marginal plastic operation by means of skin-free aural cartilage for partial trichiasis.

SIE-BOEN-LIAN. A simple entropion operation for use in mass treatment.

HESSBERG. On complicated vision in one eye.

SIEMUND. Observations on a case of lymphomatous disease of the conjunctiva.

PINES. On Denig's operative treatment of trachomatous pannus.

LACARRÈRE. A simple registering photocampimeter.

ROGGENKÄMPER. Transitory myopia following injury with a smelting-furnace slag.

ASMUS. Investigations with a distant fixation lamp and Kühl's refractometer.

FAST. Detached retina leading to a shell-like cataract.

Annali di Ottalmologia e Clinica Oculistica. *December, 1930.*

An interesting debate (continued).

CUCCO. The actual state of the aetiologico-pathogenic problem of trachoma.

GUALDI. Clinical and bio-microscopic contributions to the study of radium and X-ray cataract.

ADDARIO. The aetiology of trachoma and the new diagnostic, therapeutic and prophylactic criteria which depend on it.

Archivio di Ottalmologia. *January, 1931.*

MARIOTTI and LASCHI. On retro-bulbar neuritis of tuberculous origin.

TIRELLI. Congenital syphilitic interstitial keratitis with posterior ulceration of the cornea.

Bollettino d'Oculistica. *February, 1931.*

NICOLATO. Contribution to the surgery of complicated secondary cataract.

ANTONIBON. Conditions which may determine localization in the ocular tissues of bacteria in the blood stream.

DE LOGU. Ectropion of the uvea and intra-ocular melanotic sarcoma.

SANTORI. Ocular complications of desquamating erythrodermia.

RAVERDINO. Intrabulbar biopsy.

Lettura Oftalmologica. *January, 1931.*

MONTALTI. Ultra-violet light in hypopyon ulcer.

ADDARIO LA FERLA. Two cases of infection of the cornea with tetanus. One fatal.

KOCH. On the treatment of herpes of the cornea.

Annaes de Oculistica do Rio de Janeiro. *December, 1930.*

CONDE. Antiquity of trachoma in the north of Brazil.

COSTA. Meningococcic optic atrophy.

Archivos de Oftalmologia de Buenos Aires. *December, 1930.*

SATANOWSKY. Prescription for spectacles of protective glass for harmful rays.

SENÁ. Endocular foreign bodies *(continued)*.

Archivos de Oftalmología Hispano-Americanos. *February, 1931.*

ALCAINO and RODRIGUEZ. Considerations on 300 West's operations.

BLANCO. Two new methods of plastic operation on the lid.

BALBUENA. The infection following injury of the cornea by chestnut burr spines is usually a mycosis.

GÓMEZ-MÁRQUEZ. A new operative treatment for pterygium.

ARJONA. Injections of alcohol in ophthalmology.

ARRUGA. Treatment of scintillating scotoma.

Boletin de Informacion Oftalmologica. *November-December, 1930.*

BARRIO. Some data concerning the anatomy and pathology of the zonule of Zinn.

SORIANO. True conception of ocular tuberculosis (continued).

Rivista Oto-Neuro-Oftalmologica. *March, 1931.*

PAVIA. Hypertensive retinitis.

SARGNON and PARTHIOT. Contribution to the study of external oculo-motor paralysis in sinusitis.